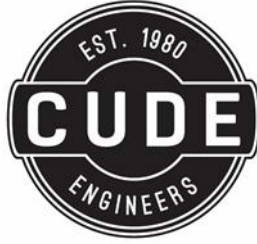


WATER POLLUTION ABATEMENT PLAN

IRON HORSE TOWNHOMES

PREPARED FOR
KHERINGTON HADLEY, LLC.

AUGUST 2019



IRON HORSE TOWNHOMES DEVELOPMENT

WATER POLLUTION ABATEMENT PLAN

PREPARED FOR:

KHERINGTON HADLEY, LLC
18618 TUSCANY STONE
SAN ANTONIO, TX 78258

Water Pollution Abatement Plan Checklist

- **Edwards Aquifer Application Cover Page (TCEQ-20705)**
- **General Information Form (TCEQ-0587)**
 - Attachment A - Road Map
 - Attachment B - USGS / Edwards Recharge Zone Map
 - Attachment C - Project Description
- **Geologic Assessment Form (TCEQ-0585)**
 - Attachment A - Geologic Assessment Table (TCEQ-0585-Table)
 - Comments to the Geologic Assessment Table
 - Attachment B - Soil Profile and Narrative of Soil Units
 - Attachment C - Stratigraphic Column
 - Attachment D - Narrative of Site Specific Geology
 - Site Geologic Map(s)
 - Table or list for the position of features' latitude/longitude (if mapped using GPS)
- **Water Pollution Abatement Plan Application Form (TCEQ-0584)**
 - Attachment A - Factors Affecting Water Quality
 - Attachment B - Volume and Character of Stormwater
 - Attachment C - Suitability Letter from Authorized Agent (if OSSF is proposed)
 - Attachment D - Exception to the Required Geologic Assessment (if requesting an exception)
 - Site Plan
- **Temporary Stormwater Section (TCEQ-0602)**
 - Attachment A - Spill Response Actions
 - Attachment B - Potential Sources of Contamination
 - Attachment C - Sequence of Major Activities
 - Attachment D - Temporary Best Management Practices and Measures
 - Attachment E - Request to Temporarily Seal a Feature, if sealing a feature
 - Attachment F - Structural Practices
 - Attachment G - Drainage Area Map
 - Attachment H - Temporary Sediment Pond(s) Plans and Calculations
 - Attachment I - Inspection and Maintenance for BMPs
 - Attachment J - Schedule of Interim and Permanent Soil Stabilization Practices
- **Permanent Stormwater Section (TCEQ-0600)**
 - Attachment A - 20% or Less Impervious Cover Waiver, if project is multi-family residential, a school, or a small business and 20% or less impervious cover is proposed for the site
 - Attachment B - BMPs for Upgradient Stormwater

Attachment C - BMPs for On-site Stormwater

Attachment D - BMPs for Surface Streams

Attachment E - Request to Seal Features (if sealing a feature)

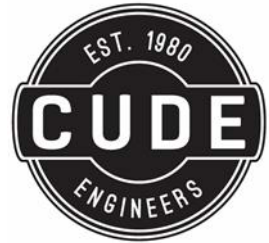
Attachment F - Construction Plans

Attachment G - Inspection, Maintenance, Repair and Retrofit Plan

Attachment H - Pilot-Scale Field Testing Plan, if BMPs not based on Complying with the Edwards Aquifer Rules: Technical Guidance for BMPs

Attachment I - Measures for Minimizing Surface Stream Contamination

- **Agent Authorization Form (TCEQ-0599), if application submitted by agent**
- **Application Fee Form (TCEQ-0574)**
- **Check Payable to the “Texas Commission on Environmental Quality”**
- **Core Data Form (TCEQ-10400)**



August 22, 2019

Monica Reyes
Texas Commission on Environmental Quality - San Antonio Region
14250 Judson Rd.
San Antonio, TX 78233-4480

Re: Iron Horse Townhomes Development
Water Pollution Abatement Plan Application Submittal

Dear Ms. De La Garza:

Please find the attached original (1), copy (1), and digital file (1) of the Ironhorse Townhomes Development Water Pollution Abatement Plan application submittal. This application has been prepared to be consistent with the Texas Commission on Environmental Quality (30 TAC 213) and its current policies for development over the Edwards Aquifer Recharge Zone.

If you should have any questions regarding the contained information, please do not hesitate to contact our office.

Sincerely,

A handwritten signature in blue ink, appearing to read "CRD", is positioned over the typed name of Christopher R. Dice.

Christopher R. Dice, P.E.
Executive Vice President

Texas Commission on Environmental Quality

Edwards Aquifer Application Cover Page

Our Review of Your Application

The Edwards Aquifer Program staff conducts an administrative and technical review of all applications. The turnaround time for administrative review can be up to 30 days as outlined in 30 TAC 213.4(e). Generally administrative completeness is determined during the intake meeting or within a few days of receipt. The turnaround time for technical review of an administratively complete Edwards Aquifer application is 90 days as outlined in 30 TAC 213.4(e). Please know that the review and approval time is directly impacted by the quality and completeness of the initial application that is received. In order to conduct a timely review, it is imperative that the information provided in an Edwards Aquifer application include final plans, be accurate, complete, and in compliance with [30 TAC 213](#).

Administrative Review

1. [Edwards Aquifer applications](#) must be deemed administratively complete before a technical review can begin. To be considered administratively complete, the application must contain completed forms and attachments, provide the requested information, and meet all the site plan requirements. The submitted application and plan sheets should be final plans. Please submit one full-size set of plan sheets with the original application, and half-size sets with the additional copies.

To ensure that all applicable documents are included in the application, the program has developed tools to guide you and web pages to provide all forms, checklists, and guidance. Please visit the below website for assistance: <http://www.tceq.texas.gov/field/eapp>.

2. This Edwards Aquifer Application Cover Page form (certified by the applicant or agent) must be included in the application and brought to the administrative review meeting.
3. Administrative reviews are scheduled with program staff who will conduct the review. Applicants or their authorized agent should call the appropriate regional office, according to the county in which the project is located, to schedule a review. The average meeting time is one hour.
4. In the meeting, the application is examined for administrative completeness. Deficiencies will be noted by staff and emailed or faxed to the applicant and authorized agent at the end of the meeting, or shortly after. Administrative deficiencies will cause the application to be deemed incomplete and returned.

An appointment should be made to resubmit the application. The application is re-examined to ensure all deficiencies are resolved. The application will only be deemed administratively complete when all administrative deficiencies are addressed.

5. If an application is received by mail, courier service, or otherwise submitted without a review meeting, the administrative review will be conducted within 30 days. The applicant and agent will be contacted with the results of the administrative review. If the application is found to be administratively incomplete, it can be retrieved from the regional office or returned by regular mail. If returned by mail, the regional office may require arrangements for return shipping.
6. If the geologic assessment was completed before October 1, 2004 and the site contains "possibly sensitive" features, the assessment must be updated in accordance with the Instructions to Geologists (TCEQ-0585 Instructions).

Technical Review

1. When an application is deemed administratively complete, the technical review period begins. The regional office will distribute copies of the application to the identified affected city, county, and groundwater conservation district whose jurisdiction includes the subject site. These entities and the public have 30 days to provide comments on the application to the regional office. All comments received are reviewed by TCEQ.
2. A site assessment is usually conducted as part of the technical review, to evaluate the geologic assessment and observe existing site conditions. The site must be accessible to our staff. The site boundaries should be

clearly marked, features identified in the geologic assessment should be flagged, roadways marked and the alignment of the Sewage Collection System and manholes should be staked at the time the application is submitted. If the site is not marked the application may be returned.

3. We evaluate the application for technical completeness and contact the applicant and agent via Notice of Deficiency (NOD) to request additional information and identify technical deficiencies. There are two deficiency response periods available to the applicant. There are 14 days to resolve deficiencies noted in the first NOD. If a second NOD is issued, there is an additional 14 days to resolve deficiencies. If the response to the second notice is not received, is incomplete or inadequate, or provides new information that is incomplete or inadequate, the application must be withdrawn or will be denied. Please note that because the technical review is underway, whether the application is withdrawn or denied the application fee will be forfeited.
4. The program has 90 calendar days to complete the technical review of the application. If the application is technically adequate, such that it complies with the Edwards Aquifer rules, and is protective of the Edwards Aquifer during and after construction, an approval letter will be issued. Construction or other regulated activity may not begin until an approval is issued.

Mid-Review Modifications

It is important to have final site plans prior to beginning the permitting process with TCEQ to avoid delays.

Occasionally, circumstances arise where you may have significant design and/or site plan changes after your Edwards Aquifer application has been deemed administratively complete by TCEQ. This is considered a "Mid-Review Modification". Mid-Review Modifications may require redistribution of an application that includes the proposed modifications for public comment.

If you are proposing a Mid-Review Modification, two options are available:

- If the technical review has begun your application can be denied/withdrawn, your fees will be forfeited, and the plan will have to be resubmitted.
- TCEQ can continue the technical review of the application as it was submitted, and a modification application can be submitted at a later time.

If the application is denied/withdrawn, the resubmitted application will be subject to the administrative and technical review processes and will be treated as a new application. The application will be redistributed to the affected jurisdictions.

Please contact the regional office if you have questions. If your project is located in Williamson, Travis, or Hays County, contact TCEQ's Austin Regional Office at 512-339-2929. If your project is in Comal, Bexar, Medina, Uvalde, or Kinney County, contact TCEQ's San Antonio Regional Office at 210-490-3096

Please fill out all required fields below and submit with your application.

1. Regulated Entity Name: Iron Horse Town Homes					2. Regulated Entity No.:				
3. Customer Name: Kherington Hadley					4. Customer No.:				
5. Project Type: (Please circle/check one)	<input checked="" type="radio"/> New	Modification			Extension		Exception		
6. Plan Type: (Please circle/check one)	<input checked="" type="radio"/> WPAP	<input type="radio"/> CZP	<input type="radio"/> SCS	<input type="radio"/> UST	<input type="radio"/> AST	<input type="radio"/> EXP	<input type="radio"/> EXT	Technical Clarification	Optional Enhanced Measures
7. Land Use: (Please circle/check one)	<input checked="" type="radio"/> Residential		Non-residential			8. Site (acres):		5.09 Ac.	
9. Application Fee:	\$3,000		10. Permanent BMP(s):			Jellyfish Filters and VFS			
11. SCS (Linear Ft.):	325 L.F.		12. AST/UST (No. Tanks):			N/A			
13. County:	Bexar		14. Watershed:			Leon Creek			

Application Distribution

Instructions: Use the table below to determine the number of applications required. One original and one copy of the application, plus additional copies (as needed) for each affected incorporated city, county, and groundwater conservation district are required. Linear projects or large projects, which cross into multiple jurisdictions, can require additional copies. Refer to the "Texas Groundwater Conservation Districts within the EAPP Boundaries" map found at:

http://www.tceq.texas.gov/assets/public/compliance/field_ops/eapp/EAPP%20GWCD%20map.pdf

For more detailed boundaries, please contact the conservation district directly.

Austin Region			
County:	Hays	Travis	Williamson
Original (1 req.)	—	—	—
Region (1 req.)	—	—	—
County(ies)	—	—	—
Groundwater Conservation District(s)	<input type="checkbox"/> Edwards Aquifer Authority <input type="checkbox"/> Barton Springs/ Edwards Aquifer <input type="checkbox"/> Hays Trinity <input type="checkbox"/> Plum Creek	<input type="checkbox"/> Barton Springs/ Edwards Aquifer	NA
City(ies) Jurisdiction	<input type="checkbox"/> Austin <input type="checkbox"/> Buda <input type="checkbox"/> Dripping Springs <input type="checkbox"/> Kyle <input type="checkbox"/> Mountain City <input type="checkbox"/> San Marcos <input type="checkbox"/> Wimberley <input type="checkbox"/> Woodcreek	<input type="checkbox"/> Austin <input type="checkbox"/> Bee Cave <input type="checkbox"/> Pflugerville <input type="checkbox"/> Rollingwood <input type="checkbox"/> Round Rock <input type="checkbox"/> Sunset Valley <input type="checkbox"/> West Lake Hills	<input type="checkbox"/> Austin <input type="checkbox"/> Cedar Park <input type="checkbox"/> Florence <input type="checkbox"/> Georgetown <input type="checkbox"/> Jerrell <input type="checkbox"/> Leander <input type="checkbox"/> Liberty Hill <input type="checkbox"/> Pflugerville <input type="checkbox"/> Round Rock

San Antonio Region					
County:	Bexar	Comal	Kinney	Medina	Uvalde
Original (1 req.)	✕	—	—	—	—
Region (1 req.)	✕	—	—	—	—
County(ies)	✕	—	—	—	—
Groundwater Conservation District(s)	<input checked="" type="checkbox"/> Edwards Aquifer Authority <input type="checkbox"/> Trinity-Glen Rose	<input type="checkbox"/> Edwards Aquifer Authority	<input type="checkbox"/> Kinney	<input type="checkbox"/> EAA <input type="checkbox"/> Medina	<input type="checkbox"/> EAA <input type="checkbox"/> Uvalde
City(ies) Jurisdiction	<input type="checkbox"/> Castle Hills <input type="checkbox"/> Fair Oaks Ranch <input checked="" type="checkbox"/> Helotes <input type="checkbox"/> Hill Country Village <input type="checkbox"/> Hollywood Park <input type="checkbox"/> San Antonio (SAWS) <input type="checkbox"/> Shavano Park	<input type="checkbox"/> Bulverde <input type="checkbox"/> Fair Oaks Ranch <input type="checkbox"/> Garden Ridge <input type="checkbox"/> New Braunfels <input type="checkbox"/> Schertz	NA	<input type="checkbox"/> San Antonio ETJ (SAWS)	NA

I certify that to the best of my knowledge, that the application is complete and accurate. This application is hereby submitted to TCEQ for administrative review and technical review.

Christopher Dice, PE

Print Name of Customer/Authorized Agent

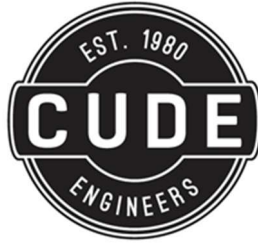
08/19/2019

Signature of Customer/Authorized Agent

Date

****FOR TCEQ INTERNAL USE ONLY****

Date(s) Reviewed:		Date Administratively Complete:	
Received From:		Correct Number of Copies:	
Received By:		Distribution Date:	
EAPP File Number:		Complex:	
Admin. Review(s) (No.):		No. AR Rounds:	
Delinquent Fees (Y/N):		Review Time Spent:	
Lat./Long. Verified:		SOS Customer Verification:	
Agent Authorization Complete/Notarized (Y/N):		Fee Check:	Payable to TCEQ (Y/N):
Core Data Form Complete (Y/N):			Signed (Y/N):
Core Data Form Incomplete Nos.:			Less than 90 days old (Y/N):



GENERAL INFORMATION SECTION

General Information Form

Texas Commission on Environmental Quality

For Regulated Activities on the Edwards Aquifer Recharge and Transition Zones and Relating to 30 TAC §213.4(b) & §213.5(b)(2)(A), (B) Effective June 1, 1999

To ensure that the application is administratively complete, confirm that all fields in the form are complete, verify that all requested information is provided, consistently reference the same site and contact person in all forms in the application, and ensure forms are signed by the appropriate party.

Note: Including all the information requested in the form and attachments contributes to more streamlined technical reviews.

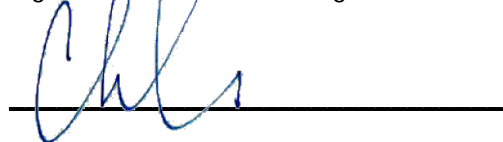
Signature

To the best of my knowledge, the responses to this form accurately reflect all information requested concerning the proposed regulated activities and methods to protect the Edwards Aquifer. This General Information Form is hereby submitted for TCEQ review. The application was prepared by:

Print Name of Customer/Agent: Christopher R. Dice

Date: August 19, 2019

Signature of Customer/Agent:



Project Information

1. Regulated Entity Name: Iron Horse Town Homes
2. County: Bexar
3. Stream Basin: SAN ANTONIO RIVER BASIN
4. Groundwater Conservation District (If applicable): EDWARDS AQUIFER AUTHORITY
5. Edwards Aquifer Zone:
☒ Recharge Zone
☐ Transition Zone
6. Plan Type:

<input checked="" type="checkbox"/> WPAP	<input type="checkbox"/> AST
<input type="checkbox"/> SCS	<input type="checkbox"/> UST
<input type="checkbox"/> Modification	<input type="checkbox"/> Exception Request

7. Customer (Applicant):

Contact Person: DALE KANE

Entity: KHERINGTON HADLEY

Mailing Address: 18618 TUSCANY STONE, SUITE 210

City, State: SAN ANTONIO, TX

Zip: 78258

Telephone: 210 - 496 - 7775

FAX: 210 - 496 - 3256

Email Address: DKANE@DIRTDEALERS.COM

8. Agent/Representative (If any):

Contact Person: CHRISTOPHER R. DICE

Entity: CUDE ENGINEERS

Mailing Address: 4122 POND HILL RD., SUITE 101

City, State: SAN ANTONIO, TX

Zip: 78231

Telephone: 210 - 681 - 2951

FAX: 210 - 523 - 7112

Email Address: CDICE@CUDEENGINEER.COM

9. Project Location:

- ☒ The project site is located inside the city limits of HELOTES, TEXAS.
- ☐ The project site is located outside the city limits but inside the ETJ (extra-territorial jurisdiction) of _____.
- ☐ The project site is not located within any city's limits or ETJ.

10. ☒ The location of the project site is described below. The description provides sufficient detail and clarity so that the TCEQ's Regional staff can easily locate the project and site boundaries for a field investigation.

An undeveloped lot between the Iron Horse Way and Lost Horse intersection , and the Iron Horse Way and Antonio Drive intersection.

11. ☒ Attachment A – Road Map. A road map showing directions to and the location of the project site is attached. The project location and site boundaries are clearly shown on the map.

12. ☒ Attachment B - USGS / Edwards Recharge Zone Map. A copy of the official 7 ½ minute USGS Quadrangle Map (Scale: 1" = 2000') of the Edwards Recharge Zone is attached. The map(s) clearly show:

- ☒ Project site boundaries.
- ☒ USGS Quadrangle Name(s).
- ☒ Boundaries of the Recharge Zone (and Transition Zone, if applicable).
- ☒ Drainage path from the project site to the boundary of the Recharge Zone.

13. ☒ The TCEQ must be able to inspect the project site or the application will be returned. Sufficient survey staking is provided on the project to allow TCEQ regional staff to locate the boundaries and alignment of the regulated activities and the geologic or manmade features noted in the Geologic Assessment.

☒ Survey staking will be completed by this date: 08/08/2019

14. ☒ Attachment C – Project Description. Attached at the end of this form is a detailed narrative description of the proposed project. The project description is consistent throughout the application and contains, at a minimum, the following details:

- ☒ Area of the site
- ☒ Offsite areas
- ☒ Impervious cover
- ☒ Permanent BMP(s)
- ☒ Proposed site use
- ☒ Site history
- ☒ Previous development
- ☒ Area(s) to be demolished

15. Existing project site conditions are noted below:

- ☐ Existing commercial site
- ☐ Existing industrial site
- ☐ Existing residential site
- ☒ Existing paved and/or unpaved roads
- ☐ Undeveloped (Cleared)
- ☒ Undeveloped (Undisturbed/Uncleared)
- ☐ Other: _____

Prohibited Activities

16. ☒ I am aware that the following activities are prohibited on the Recharge Zone and are not proposed for this project:

- (1) Waste disposal wells regulated under 30 TAC Chapter 331 of this title (relating to Underground Injection Control);
- (2) New feedlot/concentrated animal feeding operations, as defined in 30 TAC §213.3;
- (3) Land disposal of Class I wastes, as defined in 30 TAC §335.1;
- (4) The use of sewage holding tanks as parts of organized collection systems; and
- (5) New municipal solid waste landfill facilities required to meet and comply with Type I standards which are defined in §330.41(b), (c), and (d) of this title (relating to Types of Municipal Solid Waste Facilities).
- (6) New municipal and industrial wastewater discharges into or adjacent to water in the state that would create additional pollutant loading.

17. ☒ I am aware that the following activities are prohibited on the Transition Zone and are not proposed for this project:

- (1) Waste disposal wells regulated under 30 TAC Chapter 331 (relating to Underground Injection Control);

- (2) Land disposal of Class I wastes, as defined in 30 TAC §335.1; and
- (3) New municipal solid waste landfill facilities required to meet and comply with Type I standards which are defined in §330.41 (b), (c), and (d) of this title.

Administrative Information

18. The fee for the plan(s) is based on:

- ☒ For a Water Pollution Abatement Plan or Modification, the total acreage of the site where regulated activities will occur.
- ☐ For an Organized Sewage Collection System Plan or Modification, the total linear footage of all collection system lines.
- ☐ For a UST Facility Plan or Modification or an AST Facility Plan or Modification, the total number of tanks or piping systems.
- ☐ A request for an exception to any substantive portion of the regulations related to the protection of water quality.
- ☐ A request for an extension to a previously approved plan.

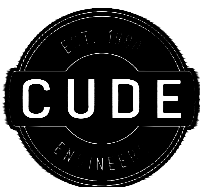
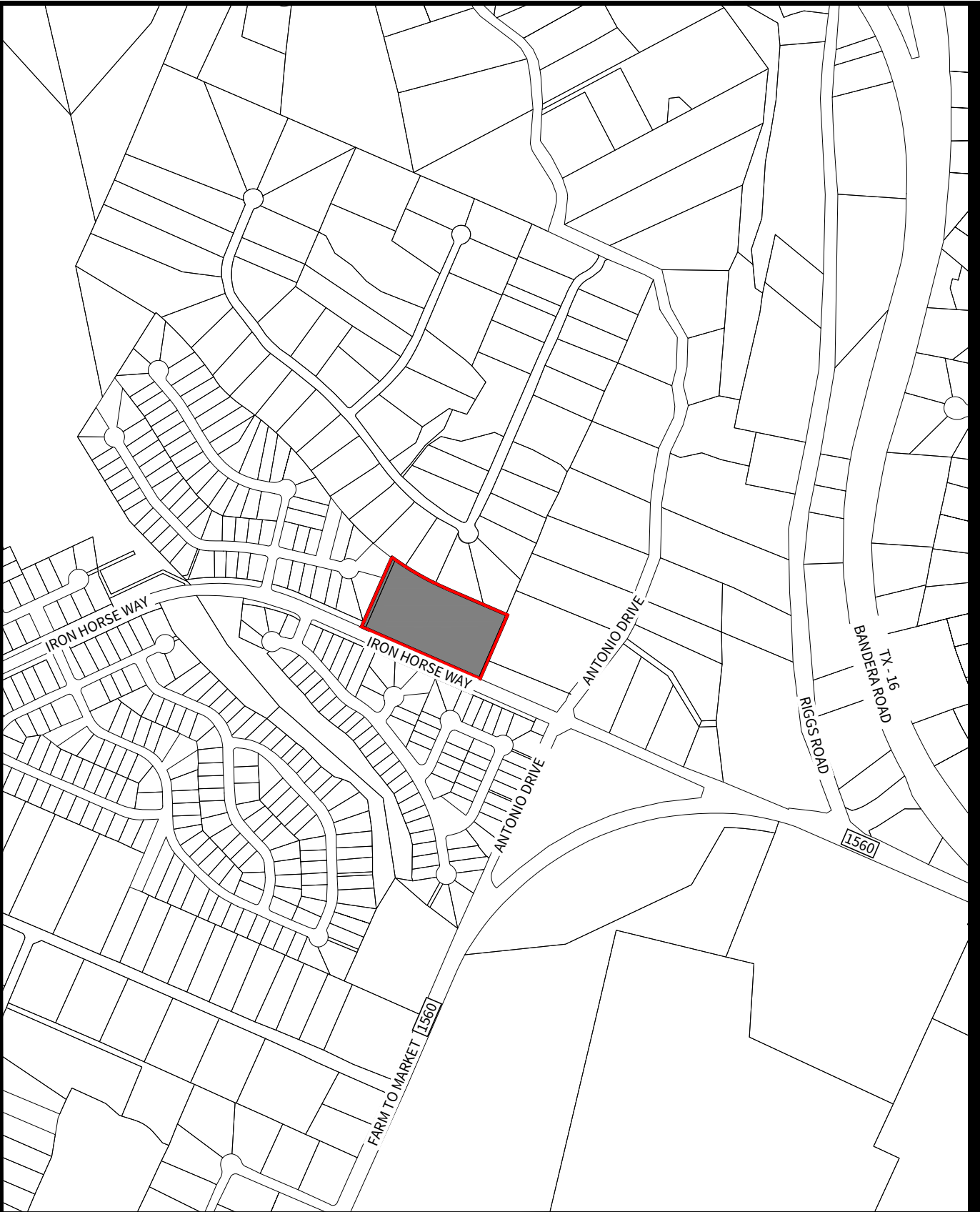
19. ☒ Application fees are due and payable at the time the application is filed. If the correct fee is not submitted, the TCEQ is not required to consider the application until the correct fee is submitted. Both the fee and the Edwards Aquifer Fee Form have been sent to the Commission's:

- ☐ TCEQ cashier
- ☐ Austin Regional Office (for projects in Hays, Travis, and Williamson Counties)
- ☒ San Antonio Regional Office (for projects in Bexar, Comal, Kinney, Medina, and Uvalde Counties)

20. ☒ Submit one (1) original and one (1) copy of the application, plus additional copies as needed for each affected incorporated city, groundwater conservation district, and county in which the project will be located. The TCEQ will distribute the additional copies to these jurisdictions. The copies must be submitted to the appropriate regional office.

21. ☒ No person shall commence any regulated activity until the Edwards Aquifer Protection Plan(s) for the activity has been filed with and approved by the Executive Director.

03404.000\1- Documents\Booklets\Exhibit A - Road Map.dwg 2019/07/15 4:11pm ploponi



CUDE ENGINEERS
4122 POND HILL RD. • SUITE 101
SAN ANTONIO, TEXAS 78231
TEL 210.681.2951 • FAX 210.523.7112
WWW.CUDEENGINEERS.COM
TBPE REGISTERED ENGINEERING
FIRM #455

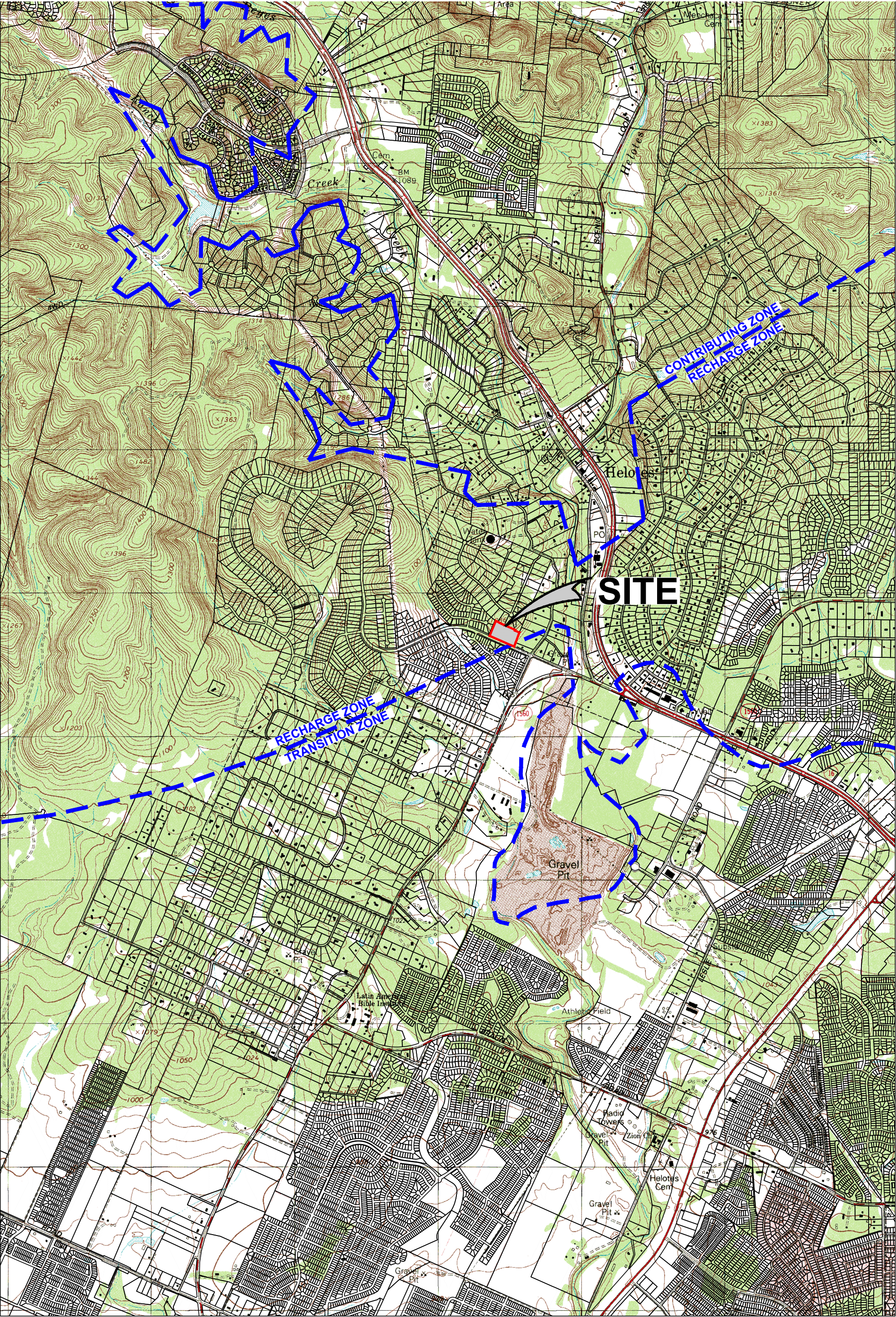
IRON HORSE TOWN HOMES

ATTACHMENT A - ROAD MAP

DATE: 2019-07-15

JOB NO.: 03404.000

PRODUCTION OF THE ORIGINAL SIGNED AND SEALED PLAN AND/OR ELECTRONIC MEDIA MAY HAVE BEEN INADVERTENTLY ALTERED. CONTRACTOR IS RESPONSIBLE FOR VERIFYING THE SCALE OF THE DOCUMENT AND CONTACTING CUDE ENGINEERS TO VERIFY DISCREPANCIES PRIOR TO CONSTRUCTION.



SITE BOUNDARY ———

HELOTES, TX QUADRANGLE

SCALE: 1" = 2000'

USGS/EDWARDS RECHARGE ZONE MAP

ATTACHMENT B

SHEET 1 OF 1



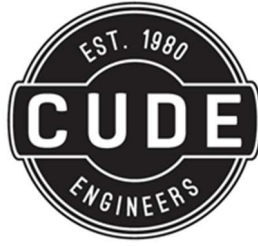
ATTACHMENT C – PROJECT DESCRIPTION

This proposed single family residential development encompasses 5.09 acres of undeveloped land located north west of the Iron Horse Way and Antonio Drive intersection. This development will consist of the construction of 35 single family town homes, street infrastructure, drainage facilities, gravity sewer infrastructure, water facilities and utility infrastructure. The site is located within the City of Helotes, Bexar County, Texas. No portion of this tract is located within the current limits of the DFIRM 1% annual chance floodplain. All of the site is located within the Edwards Aquifer Recharge Zone. Potable water will be supplied by San Antonio Water System (SAWS).

Access to the site will be provided along Iron Horse Way. The site has access to existing utilities such as electric, sewer, and water service lines. The location of the existing improvements is shown on the boundary survey included in this report.

The site splits the flow of runoff south east or south west due to the ridge that runs through the middle of the site. In both directions the runoff flows into Iron Horse Way, through various drainage and street infrastructure and ends in the Helotes Creek. Upstream areas from the site are composed of low-density residential lots.

The proposed development will consist of approximately 2.30 acres of impervious cover (45.19%). Due to the proposed impervious cover being over 20% of the project site area, permanent pollution abatement measure will be required. Temporary best management practice measures to be used are intended to inhibit sediment and suspended solids from leaving the site. By containing the sediment and solids within the site, they will not enter surface streams and/or sensitive features. Two jellyfish filters and four vegetated filter strip areas have been selected as a permanent BMP measure to treat and remove pollutants from reaching other surrounding areas downstream of the site. Please refer to the Water Pollution Abatement Plan for permanent BMPs.



GEOLOGIC ASSESSMENT SECTION

ATTACHMENTS

GEOLOGIC FORM TCEQ 0585

STRATIGRAPHIC COLUMN

GEOLOGIC ASSESSMENT TABLE

SITE GEOLOGIC MAP

GEOLOGIC FORM TCEQ 0585

FGS Project Nº FGS-E19173

Geologic Assessment

Texas Commission on Environmental Quality

For Regulated Activities on The Edwards Aquifer Recharge/transition Zones and Relating to 30 TAC §213.5(b)(3), Effective June 1, 1999

To ensure that the application is administratively complete, confirm that all fields in the form are complete, verify that all requested information is provided, consistently reference the same site and contact person in all forms in the application, and ensure forms are signed by the appropriate party.

Note: Including all the information requested in the form and attachments contributes to more streamlined technical reviews.

Signature

To the best of my knowledge, the responses to this form accurately reflect all information requested concerning the proposed regulated activities and methods to protect the Edwards Aquifer. My signature certifies that I am qualified as a geologist as defined by 30 TAC Chapter 213.

Print Name of Geologist: Chris Wickman

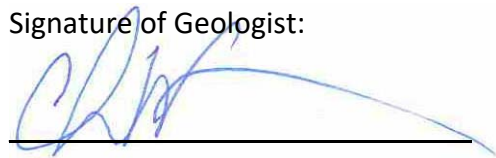
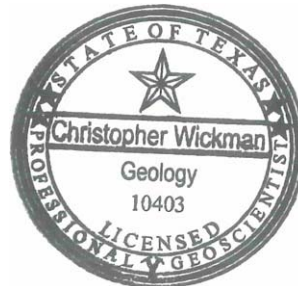
Telephone: (210) 372-1315

Date: August 1, 2019

Fax: (210) 372-1318

Representing: Frost Geosciences, Inc. Firm Registration #50040 (Name of Company and TBPG or TBPE registration number)

Signature of Geologist:

Regulated Entity Name: Helotes Townhomes Tract

Project Information

1. Date(s) Geologic Assessment was performed: May 24 2019

2. Type of Project:

☒ WPAP
☐ SCS

☐ AST
☐ UST

3. Location of Project:

☒ Recharge Zone
☐ Transition Zone
☐ Contributing Zone within the Transition Zone

4. ☒ **Attachment A - Geologic Assessment Table.** Completed Geologic Assessment Table (Form TCEQ-0585-Table) is attached.
5. ☒ Soil cover on the project site is summarized in the table below and uses the SCS Hydrologic Soil Groups* (Urban Hydrology for Small Watersheds, Technical Release No. 55, Appendix A, Soil Conservation Service, 1986). If there is more than one soil type on the project site, show each soil type on the site Geologic Map or a separate soils map.

Table 1 - Soil Units, Infiltration Characteristics and Thickness

Soil Name	Group*	Thickness(feet)
Tarrant	C	0-1

** Soil Group Definitions (Abbreviated)*

- A. Soils having a high infiltration rate when thoroughly wetted.
- B. Soils having a moderate infiltration rate when thoroughly wetted.
- C. Soils having a slow infiltration rate when thoroughly wetted.
- D. Soils having a very slow infiltration rate when thoroughly wetted.

6. ☒ **Attachment B – Stratigraphic Column.** A stratigraphic column showing formations, members, and thicknesses is attached. The outcropping unit, if present, should be at the top of the stratigraphic column. Otherwise, the uppermost unit should be at the top of the stratigraphic column.
7. ☒ **Attachment C – Site Geology.** A narrative description of the site specific geology including any features identified in the Geologic Assessment Table, a discussion of the potential for fluid movement to the Edwards Aquifer, stratigraphy, structure(s), and karst characteristics is attached.
8. ☒ **Attachment D – Site Geologic Map(s).** The Site Geologic Map must be the same scale as the applicant's Site Plan. The minimum scale is 1": 400'
 Applicant's Site Plan Scale: 1" = 40'
 Site Geologic Map Scale: 1" = 40'
 Site Soils Map Scale (if more than 1 soil type): 1" = 500'
9. Method of collecting positional data:
 - ☒ Global Positioning System (GPS) technology.
 - ☒ Other method(s). Please describe method of data collection: 2018 Aerial Photograph
10. ☒ The project site and boundaries are clearly shown and labeled on the Site Geologic Map.
11. ☒ Surface geologic units are shown and labeled on the Site Geologic Map.

12. ☒ Geologic or manmade features were discovered on the project site during the field investigation. They are shown and labeled on the Site Geologic Map and are described in the attached Geologic Assessment Table.
- ☐ Geologic or manmade features were not discovered on the project site during the field investigation.
13. ☒ The Recharge Zone boundary is shown and labeled, if appropriate.
14. All known wells (test holes, water, oil, unplugged, capped and/or abandoned, etc.): If applicable, the information must agree with Item No. 20 of the WPAP Application Section.
- ☐ There are _____ (#) wells present on the project site and the locations are shown and labeled. (Check all of the following that apply.)
- ☐ The wells are not in use and have been properly abandoned.
- ☐ The wells are not in use and will be properly abandoned.
- ☐ The wells are in use and comply with 16 TAC Chapter 76.
- ☒ There are no wells or test holes of any kind known to exist on the project site.

Administrative Information

15. ☒ Submit one (1) original and one (1) copy of the application, plus additional copies as needed for each affected incorporated city, groundwater conservation district, and county in which the project will be located. The TCEQ will distribute the additional copies to these jurisdictions. The copies must be submitted to the appropriate regional office.

STRATIGRAPHIC COLUMN

STRATIGRAPHIC COLUMN

EXPLANATION OF HYDROSTRATIGRAPHIC UNITS

Group or Formation	Formal and informal member		Hydrologic unit or Informal hydrostratigraphic unit	
Taylor Group (Pecan Gap)		Kpg	Upper Confining Unit (UCU)	
Austin Group		Ka		
Eagle Ford Group		Kef		
Buda Limestone		Kb		
Del Rio Clay		Kdr		
Georgetown Formation		Kg	I	
Person Formation	Cyclic and marine, undivided	Kpcm	II	
	Leached and collapsed	Kplc	III	
	Regional dense member	Kprd	IV	
Kainer Formation	Grainstone	Kkg	V	
	Kirschberg evaporite	Kkke	VI	
	Dolomitic	Kkd	VII	
	Basal nodular	Kkbn	VIII	
Glen Rose Limestone	Upper Glen Rose Limestone	Kgrc	Cavernous	
		Kgrcb	Camp Bullis	
		Kgrue	Upper evaporite	
		Kgruf	Fossiliferous	Upper
		Kgrlf		Lower
		Kgrle	Lower evaporite	
	Lower Glen Rose Limestone	Kgrb	Bulverde	
		Kgrlb	Little Blanco	
		Kgrts	Twin Sisters	
		Kgrd	Doepenschmidt	
		Kgrr	Rust	
		Kgrhc	Honey Creek	
Pearsall Formation	Hensell Sand	Kheh	Hensell	
	Cow Creek Limestone	Kcccc	Cow Creek	
	Hammett Shale	Khah	Hammett	

GEOLOGIC ASSESSMENT TABLE

GEOLOGIC ASSESSMENT TABLE

PROJECT NAME: Helotes Townhomes Tract

PROJECT NUMBER: FGS-E19173

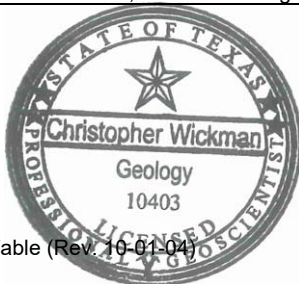
LOCATION			FEATURE CHARACTERISTICS												EVALUATION			PHYSICAL SETTING		
1A	1B *	1C*	2A	2B	3	4			5	5A	6	7	8A	8B	9	10		11		12
FEATURE ID	LATITUDE	LONGITUDE	FEATURE TYPE	POINTS	FORMATION	DIMENSIONS (FEET)			TREND (DEGREES)	DOM	DENSITY (NO/FT)	APERTURE (FEET)	INFILL	RELATIVE INFILTRATION RATE	TOTAL	SENSITIVITY		CATCHMENT AREA (ACRES)	TOPOGRAPHY	
						X	Y	Z		10						<40	>40	<1.6	>1.6	
S-1	29° 34' 1.45"	-98° 41' 44.59"	SC	20	Kkd	0.5	2	1.5	-	-	-	-	CFO	12	32	32		YES		HILLSIDE
S-2	29° 34' 3.97"	-98° 41' 47.33"	SC	20	Kkd	0.5	1	1	-	-	-	-	CFO	10	30	30		YES		HILLSIDE
S-3	29° 34' 4.48"	-98° 41' 45.2"	SC	20	Kkd	2	2	1	-	-	-	-	CFO	10	30	30		YES		HILLSIDE
S-4	29° 34' 3.25"	-98° 41' 44.23"	SC	20	Kkd	2.	3	2	-	-	-	-	CFO	12	32	32		YES		HILLSIDE
S-5	29° 34' 1.16"	-98° 41' 43.8"	F	20	Kkd/Kb	-	-	-	-	-	-	-	CFO	10	30	30		YES		HILLSIDE

Datum: NAD 83

2A TYPE	TYPE	2B POINTS
C	Cave	30
SC	Solution cavity	20
SF	Solution-enlarged fracture(s)	20
F	Fault	20
O	Other natural bedrock features	5
MB	Manmade feature in bedrock	30
SW	Swallow hole	30
SH	Sinkhole	20
CD	Non-karst closed depression	5
Z	Zone, clustered or aligned features	30

8A INFILLING	
N	None, exposed bedrock
C	Coarse - cobbles, breakdown, sand, gravel
O	Loose or soft mud or soil, organics, leaves, sticks, dark colors
F	Fines, compacted clay-rich sediment, soil profile, gray or red colors
V	Vegetation. Give details in narrative description
FS	Flowstone, cements, cave deposits
X	Other materials

12 TOPOGRAPHY
Cliff, Hilltop, Hillside, Floodplain, Streambed



I have read, I understood, and I have followed the Texas Commission on Environmental Quality's Instructions to Geologists.
The information presented here complies with that document and is a true representation of the conditions observed in the field.
My signature certifies that I am qualified as a geologist as defined by 30 TAC 213.

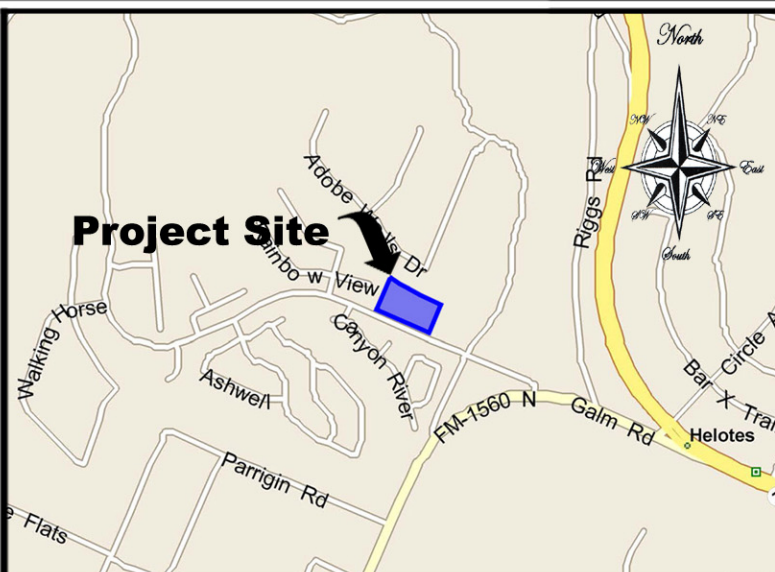
Chris Wickman, P.G.

Date August 1, 2019

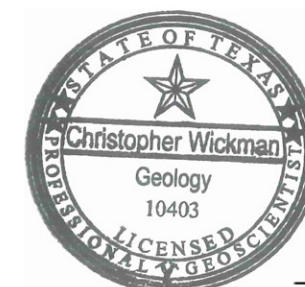
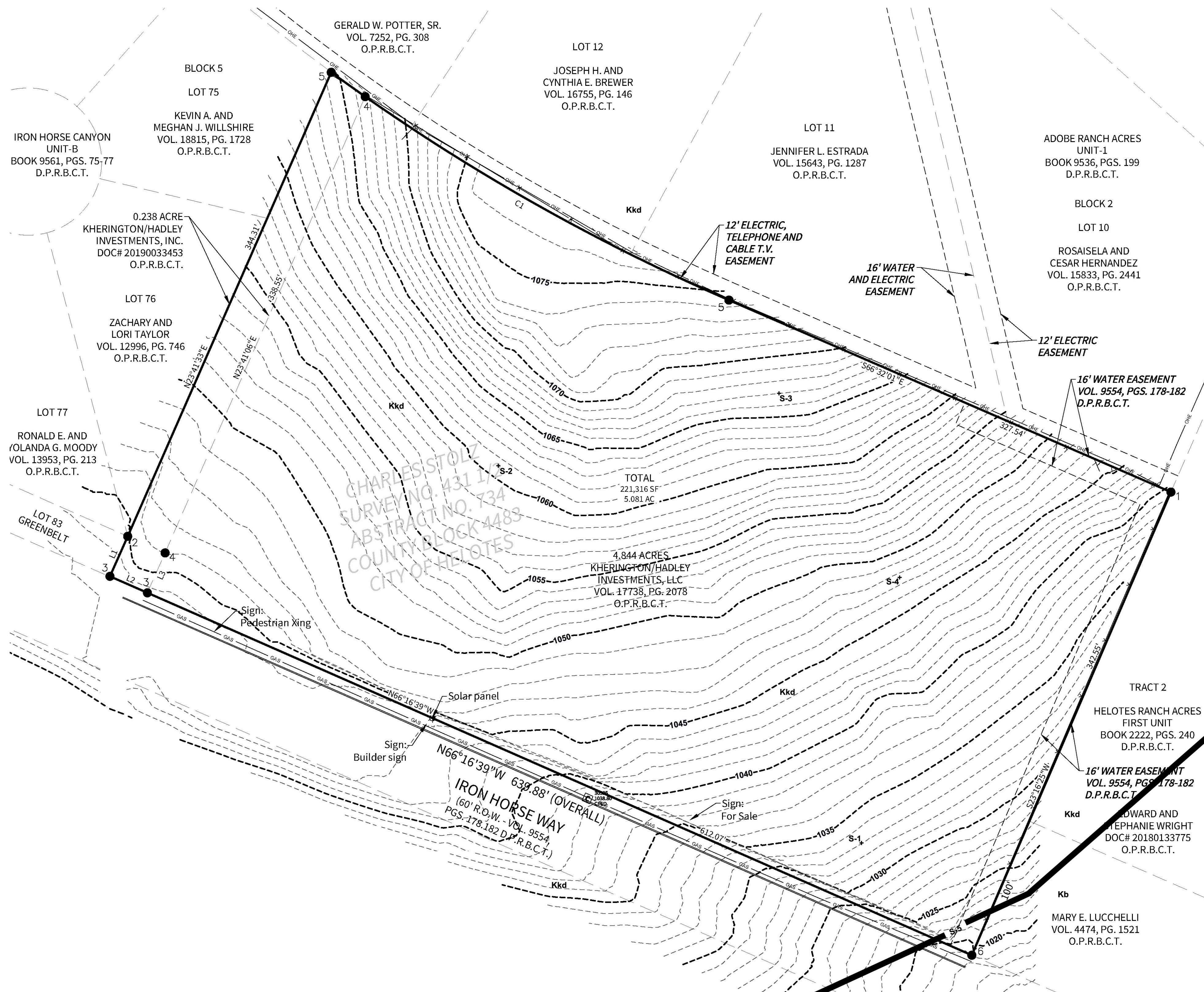
TCEQ-0585-Table (Rev. 10-01-04)

Sheet 1 of 1

FGS Project N° FGS-E19173



Location Map



Chris Wickman
Signature of Texas Licensed Geoscientist
Chris Wickman License No. 10403



Site Geologic Map

Geologic Site Assessment (WPAP)
for Regulated Activities / Development on the
Edwards Aquifer Recharge / Transition Zone
for the

Helotes Townhomes
+/- 5 Acres
Helotes, Texas

Frost GeoSciences, Inc. Control # FGS-19173

Legend

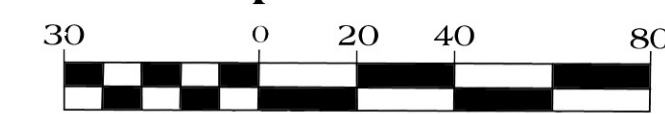
- Kb - Buda limestone
- Kkd - Edwards Kainer Dolomitic limestone
- Kkbn - Edwards Kainer Basal Nodular limestone
- S# - Potential Recharge Feature (PRF)
- - - Formation Contact
- Fault

Floodplain Information Obtained From FIRMs: Flood Insurance Rate Map
Bexar County, Texas: Panel # 48029C0205G, Revised 9/29/2010

Fault Information Obtained From:
Bureau of Economic Geology, Geologic Atlas of Texas, San Antonio Sheet (1983)
U.S. Geological Survey, Water Resources Investigations Report - 95-4030 (1995)
Geologic Map of the New Braunfels, Texas 30 X 60 Minute Quadrangle (2000)
U.S. Geological Survey Geologic Framework and Hydrostratigraphy of the Edwards
and Trinity Aquifers within Northern Bexar and Comal Counties, Texas (2016)



Graphic Scale



(In Feet)
1 inch = 40 feet
Representative Fraction 1:480

Contour Interval - 1 foot

GEOLOGIC ASSESSMENT (WPAP)

HELOTES TOWNHOMES TRACT
+/- 5 ACRES
HELOTES, TEXAS

FROST GEOSCIENCES, INC. PROJECT NO.: FGS-E19173
AUGUST 1, 2019

Prepared exclusively for

Kherington Hadley Investments
18618 Tuscan Stone, Suite 210
San Antonio, Texas 78258

The logo features a large, dark blue, stylized 'C' or swoosh shape that frames the company name. The name 'Frost GeoSciences' is written in a bold, sans-serif font. 'Frost' is in a dark grey color, while 'GeoSciences' is in a lighter, metallic-looking grey with a slight gradient.

Frost GeoSciences

Geotechnical ▪ Construction Materials
Geologic ▪ Environmental



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www.frostgeosciences.com
TBPE Firm Registration # F-9227
TBPG Firm Registration # 50040

August 1, 2019

Kherington Hadley Investments
18618 Tuscany Stone, Suite 210
San Antonio, Texas 78258

Attn: Mr. Dale Kane

SUBJECT:

Geologic Assessment (WPAP)
for the Regulated Activities / Development on the
Edwards Aquifer Recharge / Transition Zone
Helotes Townhomes Tract
+/- 5 Acres
Helotes, Texas
FGS Project N° FGS-E19173

Dear Mr. Dale Kane:


Frost GeoSciences, Inc., (FGS) is pleased to submit the enclosed Geologic Assessment completed for the above referenced project site as it relates to 30 TAC §213.5(b)(3), effective June 1, 1999. Our investigation was conducted, and this report was prepared in general accordance with the "Instructions to Geologists", TCEQ-0585-Instructions (Rev. 10-1-04).

If you have any questions regarding this report, or if Frost GeoSciences, Inc. may be of additional assistance to you on this project, please feel free to call our office. It has been a pleasure to work with you and we wish to thank you for the opportunity to be of service to you on this project. We look forward to being of continued service.

We appreciate the opportunity to perform these services for Kherington Hadley Investments. Please contact the undersigned if you have questions regarding this report.

Respectfully submitted,
Frost GeoSciences, Inc.




Chris Wickman, P.G.
Senior Geologist

Copies Submitted:

(1)	Mr. Dale Kane; Kherington Hadley Investments
(6)	Cude Engineers
(1)	Electronic (pdf) Copy

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LOCATION

The project site is located along and north of Iron Horse Way, approximately 430 feet northwest of the intersection of Iron Horse Way and Antonio Drive in Helotes, Texas. An overall view of the area is shown on copies of the site plan, a street map, the U.S.G.S. Topographic Map, the Bexar County Watersheds Map, the EAA-Edwards Aquifer Recharge Zone and Contributing Zone Map, the FIRM Map, the U.S. Geological Survey, Geologic Framework and Hydrostratigraphy of the Edwards and Trinity Aquifers within Northern Bexar and Comal Counties, Texas, Science Investigations Map 3366, a 2018 aerial photograph at a scale of 1"=500', a 2018 aerial photograph at a scale of 1"=100', and a 1962 aerial photograph at a scale of 1"=500' and are included on Figures 1 through 10 in Appendix A.

METHODOLOGY

The Geologic Assessment was performed by Chris Wickman, P.G., Senior Geologist with Frost GeoSciences, Inc. Mr. Wickman is a Licensed Professional Geoscientist in the State of Texas (License # 10403).

Frost GeoSciences, Inc. researched the geology of the area northwest of the intersection of Iron Horse Way and Antonio Drive in Helotes, Texas. The research included, but was not limited to, the Geologic Atlas of Texas, San Antonio Sheet, FEMA maps, Edwards Aquifer Recharge Zone Maps, U.S.G.S. 7.5 Minute Quadrangle Maps, U.S. Geological Survey, Geologic Framework and Hydrostratigraphy of the Edwards and Trinity Aquifers within Northern Bexar and Comal Counties, Texas, Science Investigations Map 3366, the Bureau of Economic Geology-Geologic Atlas of Texas, the Geologic Map of the New Braunfels, Texas 30 X 60 Minute Quadrangle, the U.S.G.S. Water-Resources Investigations Report 95-4030, and the U.S.D.A. Soil Survey of Bexar County, Texas.

After reviewing the available information, a field investigation was performed to identify any geologic or man-made Potential Recharge Features (PRFs). A transect spacing of approximately 50 feet, or less depending on vegetation thickness, was used to inspect the project area. A 2018 aerial photograph, in conjunction with a hand-held Garmin GPS 72H Global Positioning System with an Estimated Potential Error ranging from 10 to 14 feet, was used to navigate around the property and identify the locations of PRFs, as recommended in the "Instructions to Geologists", TCEQ-0585-Instructions (Rev. 10-1-04). The locations of any PRFs noted in the field were marked with blue and white flagging. The flagging is numbered with the same potential recharge feature I.D. # that is used on the Site Geologic Map. The Site Geologic Map, indicating the limits of the project site, and the locations of PRFs and rock outcrops noted on the project site, is included in the Attachments at the end of this report. A copy of a 2018 Aerial Photograph at an approximate scale of 1" =100' indicating the limits of the project site, and the locations of PRFs and rock outcrops noted on the project site, is included on Figure 10 in Appendix A. The Geologic Assessment Form TCEQ-0585, (Rev. 2-11-15), Stratigraphic Column, and the Geologic Assessment Table have been filled with the appropriate information for this project site and are included with the Attachments at the end of this report.

RESEARCH & OBSERVATIONS

7.5 Minute Quadrangle Map Review

According to the U.S.G.S. 7.5 Minute Quadrangle Map, Helotes, Texas Sheet (1992), the elevation across the project site ranges from 1030 to 1080 feet above mean sea level. The project site has a total relief of approximately 50 feet. Runoff from the project site flows to the south and southeast into an unnamed tributary of Helotes Creek. The project site is depicted as undeveloped wooded land. The intersection of Iron Horse Way and Antonio Drive is located approximately 430 feet southeast of the project site. Numerous small residential structures are located south and east of the project site. A copy of the U.S.G.S. 7.5 Minute Quadrangle Map indicating the location of the project site is included on Figure 3 in Appendix A.

Bexar County Watersheds Map

According to the Bexar County Watersheds Map (2003), the project site is located within the Culebra Creek Watershed Area. A copy of the Bexar County Watersheds Map indicating the location of the project site is included on Figure 4 in Appendix A.

Recharge/Transition Zone

According to the E.A.A. Edwards Aquifer Recharge Zone and Contributing Zone Map, Helotes, Texas (2014), the Official Edwards Aquifer Recharge Zone Map, Helotes, Texas Sheet (1992), and Edwards Underground Water District Reference Map, (March 1988), the project site is located within the Recharge Zone of the Edwards Aquifer. A copy of the E.A.A. Edwards Aquifer Recharge Zone and Contributing Zone Map indicating the location of the project site is included on Figure 5 in Appendix A.

100-Year Floodplain

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map, Community Panel Number 48029C0205G, dated September 29, 2010 was reviewed to determine if the project site is located in areas prone to flooding. A review of the above-mentioned Panel No. indicates that the project site is located within "Zone X". According to the Panel Legend, Zone X represents areas determined to be outside the 0.2% annual chance floodplain. A copy of the above referenced FIRM panel indicating the location of the project site is included on Figure 6 in Appendix A.

Soils

According to the United States Department of Agriculture, Soil Conservation Service, Soil Survey of Bexar County, Texas, issued (1966), the project site is located on the Tarrant association, rolling, 5 to 15 percent slopes (TaC) and the Tarrant associate, hilly, 15 to 30 percent slopes (TaD). A copy of the 1962 aerial photo (approximate scale: 1" = 500') from the U.S.D.A. Soil Survey of Bexar County, Texas indicating the location of the project site and the soil types is included on Figure 7 in Appendix A.

- The Tarrant association, rolling, rolling, 5 to 15 percent slopes (TaC) consists of stony soils that are very shallow, dark colored, and gently undulating to steep. The Tarrant Association occurs on the limestone prairies in the northern third of the county. The

surface layer is very dark grayish brown, calcareous clay loam and is about 10 inches thick. It has moderate, fine, subangular blocky structure. This layer is crumbly and friable when moist. Limestone fragments that range from a quarter of an inch to 24 inches in diameter cover about 35 percent of the surface. The subsurface layer, about 8 inches thick, is hard fractured limestone. The cracks and spaces are filled with dark grayish brown clay loam. The bedrock is hard limestone. Tarrant soils have rapid surface drainage and good internal drainage. The capacity to hold water is low. Natural fertility is high. Water erosion is a hazard. This soil has a USDA Texture Classification of Clay Loam. The Unified Classification is CL or CH. The AASHTO Classification is A-7. This soil has an average permeability from 1.0 to 1.5 inches/hour.

- The Tarrant association, hilly, 15 to 30 percent slopes (TaD) consist of stony soils that are very shallow, dark colored, and gently undulating to steep. The surface layer is very dark grayish brown, calcareous clay loam and is about 10" thick. It has moderate, fine, subangular blocky structure. This layer is crumbly and friable when moist. Limestone fragments that range from a quarter of an inch to 24" in diameter cover about 35 percent of the surface. The subsurface layer, about 8" thick, is hard fractured limestone. The cracks and spaces are filled with dark grayish brown clay loam. The bedrock is hard limestone. Tarrant soils have rapid surface drainage and good internal drainage. The capacity to hold water is low. Natural fertility is high. Water erosion is a hazard. This soil has a USDA Texture Classification of Clay Loam. The Unified Classification is CL or CH. The AASHTO Classification is A-7. This soil has an average permeability from 1.0 to 1.5 inches/hour.

Narrative Description of the Site Geology

Based on a visual inspection of the ground surface, the overall potential for fluid flow from the project site into the Edwards Aquifer appears to be low. The locations of the PRFs are identified on the 2018 aerial photograph on Figure 10 in Appendix A, and on the Site Geologic Map provided in Appendix C. Color photos of the project site and some of the PRFs are included in Appendix B.

- PRF #S-1 is an elongate solution cavity occurring on a hillside located adjacent to the base of a tree. The feature opening was approximately 2 feet long, 0.5 feet wide and about 1½ feet deep. The cavity appears to be the result of vegetation wedging the rocks up from the surrounding surface. The cavity appeared to be filled with fine soils and clay with a scattering of leaves on the surface. Frost GeoSciences rates these features as low on figure 1 of the TCEQ-0585-Instructions (Rev. 10-01-04). This feature scores 32 points on the sensitivity scale, column 10 of the Geologic Assessment Table included within the Attachments at the end of this report.
- PRF #S-2 is a triangular shaped solution cavity occurring on a hillside located adjacent to the base of a limestone boulder. The feature opening was approximately 1 foot long, 0.5 feet wide and about 1 foot deep. The cavity may have been the result of a burrowing animal excavating the small feature. The cavity appeared to be filled with fine soils and

clay. Frost GeoSciences rates the feature as low on figure 1 of the TCEQ-0585-Instructions (Rev. 10-01-04). This feature scores 30 points on the sensitivity scale, column 10 of the Geologic Assessment Table included within the Attachments at the end of this report.

- PRF #S-3 is a depressed area under three adjacent limestone boulders. The small cavity observed under the boulders was approximately 2 feet in diameter and appears to be 1 foot in depth. The cavity is lined with fine soil, clay and juniper fronds. The cavity may have been from the excavation of burrowing animals. Frost GeoSciences rates the feature as low on figure 1 of the TCEQ-0585-Instructions (Rev. 10-01-04). The feature scores 30 points on the sensitivity scale, column 10 of the Geologic Assessment Table included within the Attachments at the end of this report.
- PRF #S-4 is a depressed area between two adjacent limestone boulders. The small cavity observed between the boulders was approximately 3 feet long, 2 feet wide and appeared to be 2 foot in depth. The cavity is lined with fine soil and clay. Frost GeoSciences rates the feature as low on figure 1 of the TCEQ-0585-Instructions (Rev. 10-01-04). The feature scores 32 points on the sensitivity scale, column 10 of the Geologic Assessment Table included within the Attachments at the end of this report.
- PRF #S-5 is a fault identified on the U.S. Geological Survey, Geologic Framework and Hydrostratigraphy of the Edwards and Trinity Aquifers within Northern Bexar and Comal Counties, Texas, Science Investigations Map 3366. The fault is depicted crossing through the southeastern corner of the project site. The fault is depicted as a contact between the Dolomitic member of the Edwards Kainer limestone (Kkd) and the Buda limestone (Kb). However, due to the dense vegetative cover in this portion of the project site and asphalt paving of Iron Horse Way, visual indications of the fault were not observed during the site reconnaissance. Frost GeoSciences, Inc. rates the relative infiltration of the fault as low on figure 1 of the TCEQ-0585-Instructions (Rev. 10-01-04). The feature scores a 30 on the sensitivity scale, column 10 in the Geologic Assessment Table included with the Attachments at the end of this report. Frost GeoSciences, Inc. does not consider indicated fault to be sensitive.

The project site is covered by moderately dense to dense stand of vegetative cover with a few open grassy areas. Site visit photos indicating the condition of the property at the time of the on-site inspection are included in Appendix B. Overall vegetation on the project site consists of ashe juniper (*Juniperus ashei*), live oak (*Quercus virginiana*), and cedar elm (*Ulmus crassifolia*), with Texas persimmon (*Diospyros texana*), agarita (*Berberis trifoliolata*), yucca (*Yucca treculeana*), and prickly pear cactus (*Opuntia lindheimeri*). The variations in the vegetative cover on the property are visible in the 2018 aerial photo on Figures 9 and 10 in Appendix A. A copy of the site layout indicating the boundary of the project site and the elevations is included on the Site Geologic Map in Appendix C of this report.

According to the U.S. Geological Survey, Geologic Framework and Hydrostratigraphy of the Edwards and Trinity Aquifers within Northern Bexar and Comal Counties, Texas, Science Investigations Map 3366, the project site is located on the Dolomitic Member of the Cretaceous Edwards Kainer

Limestone (Kkd). A copy of the U.S. Geological Survey, Geologic Framework and Hydrostratigraphy of the Edwards and Trinity Aquifers within Northern Bexar and Comal Counties, Texas, Science Investigations Map 3366 is included on Figure 8 in Appendix A. A copy of the Stratigraphic Column highlighting the outcropping formations is included within the ATTACHMENTS at the end of this report. According to the above geologic map a fault (PRF #S-5) crosses the southeastern corner of the Site. Due to the dense vegetative cover and the presence of Iron Horse Way, no obvious indications if the fault were observed at the time of the Site visit.

- The Dolomitic Member of the Edwards Kainer Limestone consists of mudstone to grainstone with crystalline limestone and chert. This member is massively bedded and light gray with abundant fossils of *Toucasia*. Karst features within this member are typically related to structure or bedding planes. Overall thickness ranges from 110 to 130 feet.

According to the site plan provided by Cude Engineers, the surveyed elevations on the project site range from 1019 to 1076 feet. According to this survey, the total relief on the project site is approximately 57 feet. A copy of the site plan indicating the boundary of the project site and the elevations is included on the Site Plan on Figure 1 in Appendix A and the Site Geologic Map in Appendix C of this report.

BEST MANAGEMENT PRACTICES

Based on a visual inspection of the ground surface, the overall potential for fluid flow from the project site into the Edwards Aquifer appears to range from low to moderate. The potential always exists to encounter solution cavities within the subsurface during excavating activities. Frost GeoSciences, Inc. is of the opinion that it is very important for construction personnel to be informed of the potential to encounter cavities in the subsurface that lack a surface expression. Construction personnel should also be informed of the proper protocol to follow in the event a karst feature is encountered during the development of the project site.

DISCLAIMER

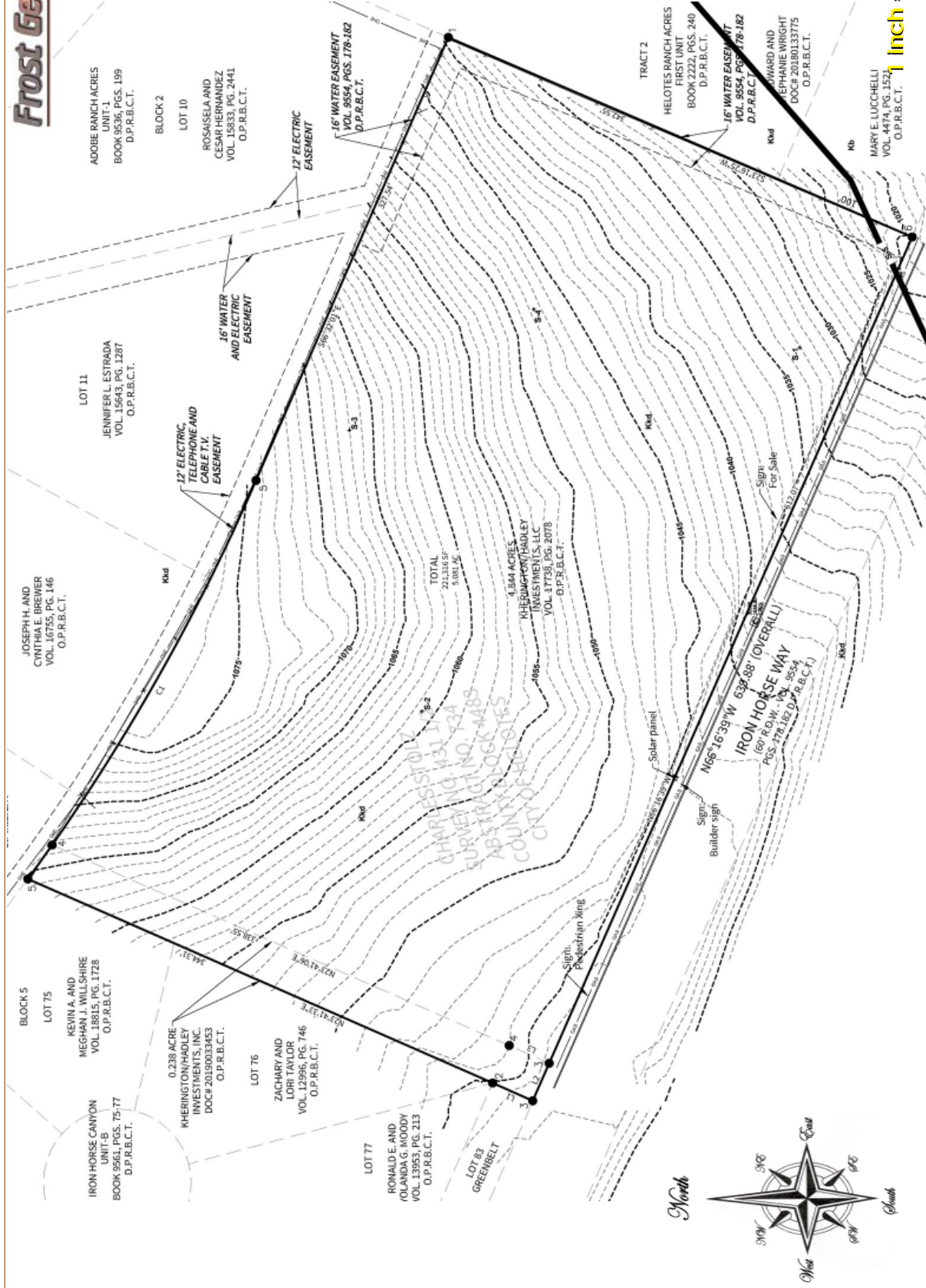
This report has been prepared in general accordance with the "Instructions to Geologists", TCEQ-0585-Instructions (Rev. 10-1-04) by a Licensed Texas Professional Geoscientist. All areas of the project site were carefully inspected for features that could contribute to the recharge of the Edwards Aquifer; however, this survey cannot preclude the presence of subsurface karst features that lack surface expression. This report is not intended to be a definitive investigation of all possible geologic or karst features at this site. All conclusions, opinions, and recommendations for Best Management Practices (BMP's) in this report are based on information obtained while researching the project and on the site conditions at the time of our field investigation.

This report has been prepared for the exclusive use of Kherington Hadley Investments. This report is based on available known records, a visual inspection of the project site, and the work generally accepted for a Geologic Assessment for Regulated Activities / Developments on the Edwards Aquifer Recharge / Transition Zone, relating to 30 TAC §213.5(b)(3), effective June 1, 1999.

REFERENCES

1. USGS - 7.5 Minute Topographic Quadrangle of Helotes, Texas, 1992
2. E.A.A. Edwards Aquifer Recharge Zone and Contributing Zone Map, Helotes, Texas (2014).
3. Official Edwards Aquifer Recharge Zone Map, Helotes, Texas, 1992
4. The Texas Commission on Environmental Quality (TCEQ) website: Edwards Aquifer Viewer – <https://tceq.maps.arcgis.com/apps/webappviewer/index.html>.
5. Clark, A.K., Golab, J.A. and Morris, R.R., 2016, Geologic Framework and Hydrostratigraphy of the Edwards and Trinity Aquifers within Northern Bexar and Comal Counties, Texas, Science Investigations Map 3366, United States Geological Survey.
6. Clark, A.K., Golab, J.A. and Morris, R.R., 2016, Geologic Framework and Hydrostratigraphy of the Edwards and Trinity Aquifers within Northern Bexar and Comal Counties, Texas, United States Geological Survey.
7. Collins, Edward, W., 2000, Geologic Map of the New Braunfels 30 X 60 Minute Quadrangle, Bureau of Economic Geology, The University of Texas at Austin, Texas.
8. Stein, W.G. and Ozuna, G.B., 1995, Geologic Framework and Hydrogeologic Characteristics of the Edwards Aquifer Recharge Zone, Bexar County, Texas, U.S. Geological Survey Water Resources Investigations 95-4030.
9. Barnes, V.L., 1982, Geologic Atlas of Texas San Antonio, Texas Sheet, Bureau of Economic Geology and University of Texas at Austin, Geologic Atlas of Texas.
10. Federal Emergency Management Agency, Federal Insurance Administration, National Flood Insurance Program, Flood Insurance Map, Community Panel Number 48029C0205G, dated September 29, 2010
11. United States Department of Agriculture Soil Conservation Service Soil Survey of Bexar County 1966.
12. USDA NRCS Web Soil Survey (WSS) website: <https://websoilsurvey.nrcs.usda.gov> (2014)
13. TCEQ-0585-Instructions (Rev. 10-1-04), "Instructions to Geologists for Geologic Assessments on the Edwards Aquifer Recharge/Transition Zone".
14. San Antonio Water Systems, Bexar County Watersheds Map, 2004.

APPENDIX A
SITE LOCATION FIGURES



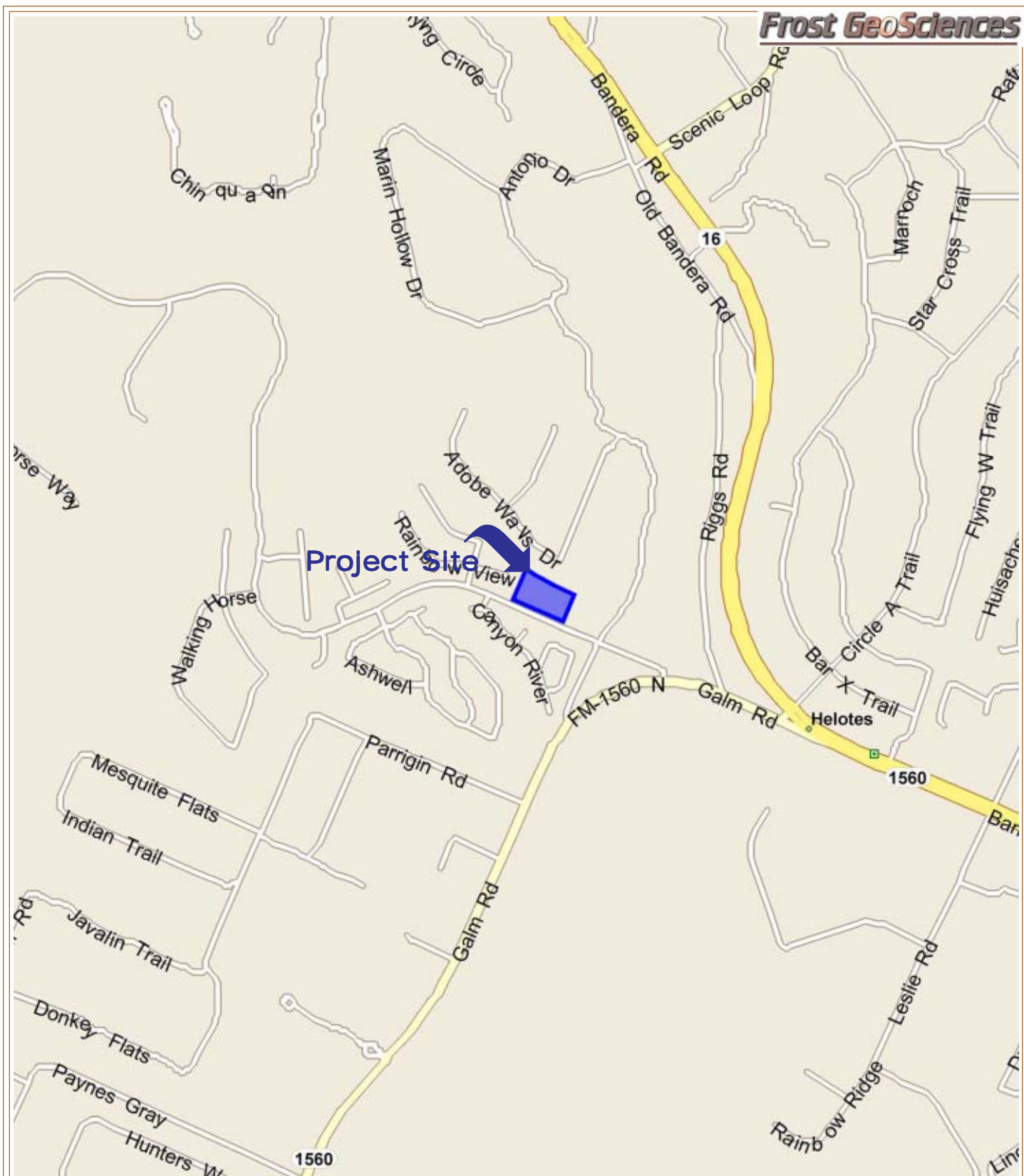
PROJECT NAME:

Geologic Site Assessment (WPAP)
for Regulated Activities / Development on the
Edwards Aquifer Recharge / Transition Zone
Helotes Townhomes Tract
Helotes, Texas

Site Layout

PROJECT NO.: FGS-E19173

DATE: August 1, 2019



PROJECT NAME:

Geologic Site Assessment (WPAP)
for Regulated Activities / Development on the
Edwards Aquifer Recharge / Transition Zone
Helotes Townhomes Tract
Helotes, Texas

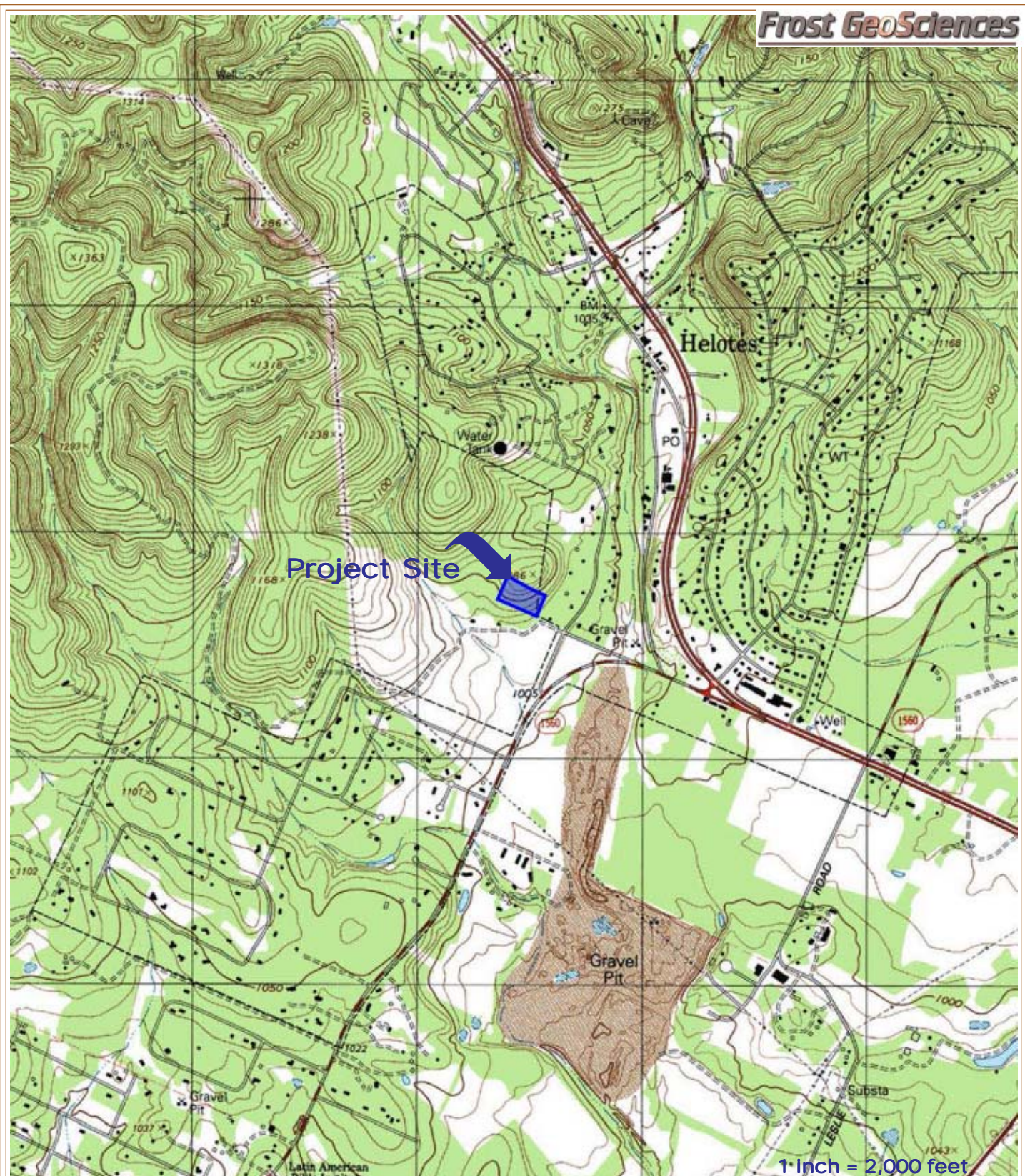
Street Map

PROJECT NO.:

FGS-E19173

DATE:

August 1, 2019



PROJECT NAME:

Geologic Site Assessment (WPAP)
for Regulated Activities / Development on the
Edwards Aquifer Recharge / Transition Zone
Helotes Townhomes Tract
Helotes, Texas

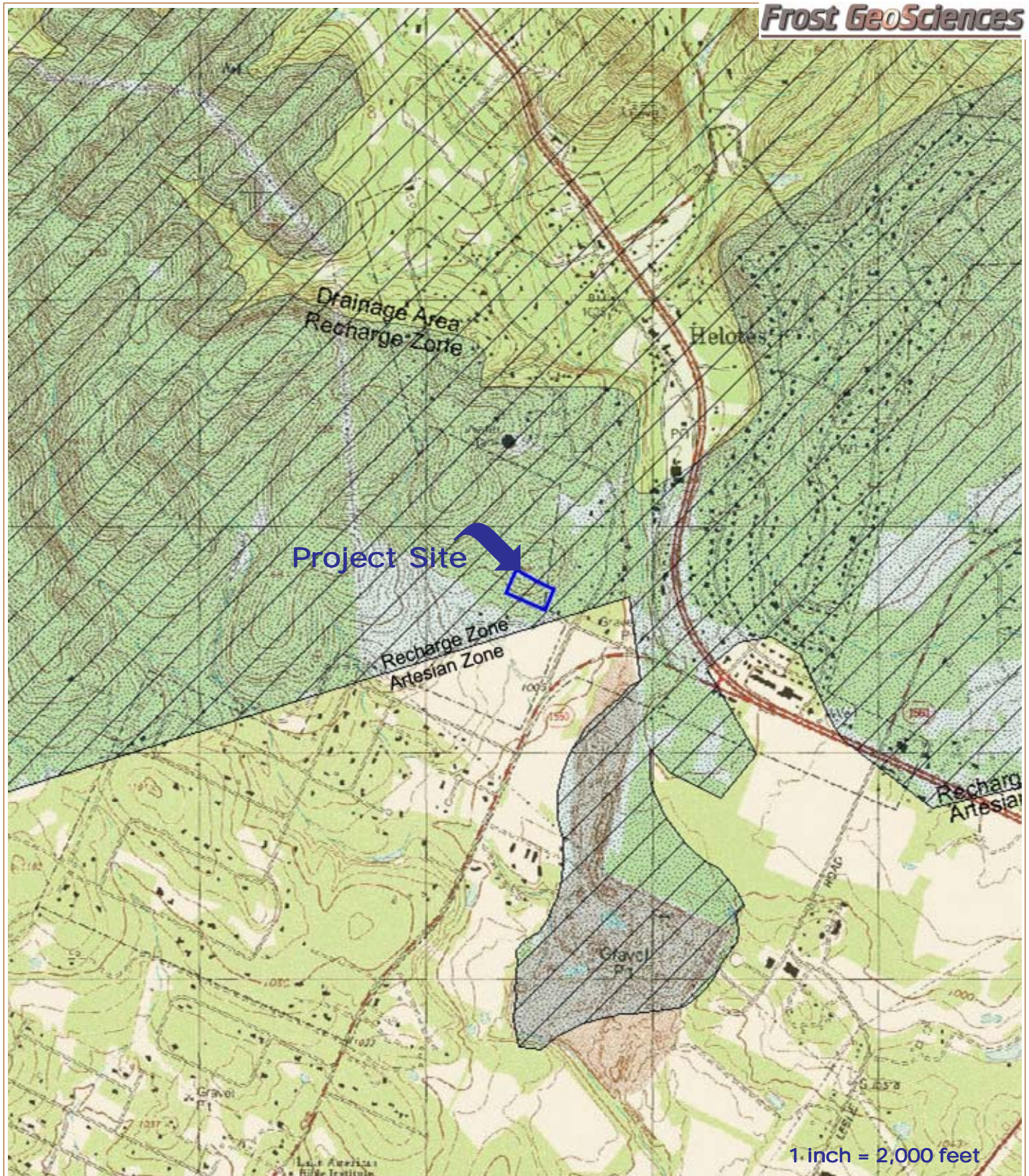
U.S.G.S. 7.5 Minute Quadrangle Map
Helotes, Texas (1992)

PROJECT NO.:

FGS-E19173

DATE:

August 1, 2019



PROJECT NAME:

Geologic Site Assessment (WPAP)
for Regulated Activities / Development on the
Edwards Aquifer Recharge / Transition Zone
Helotes Townhomes Tract
Helotes, Texas

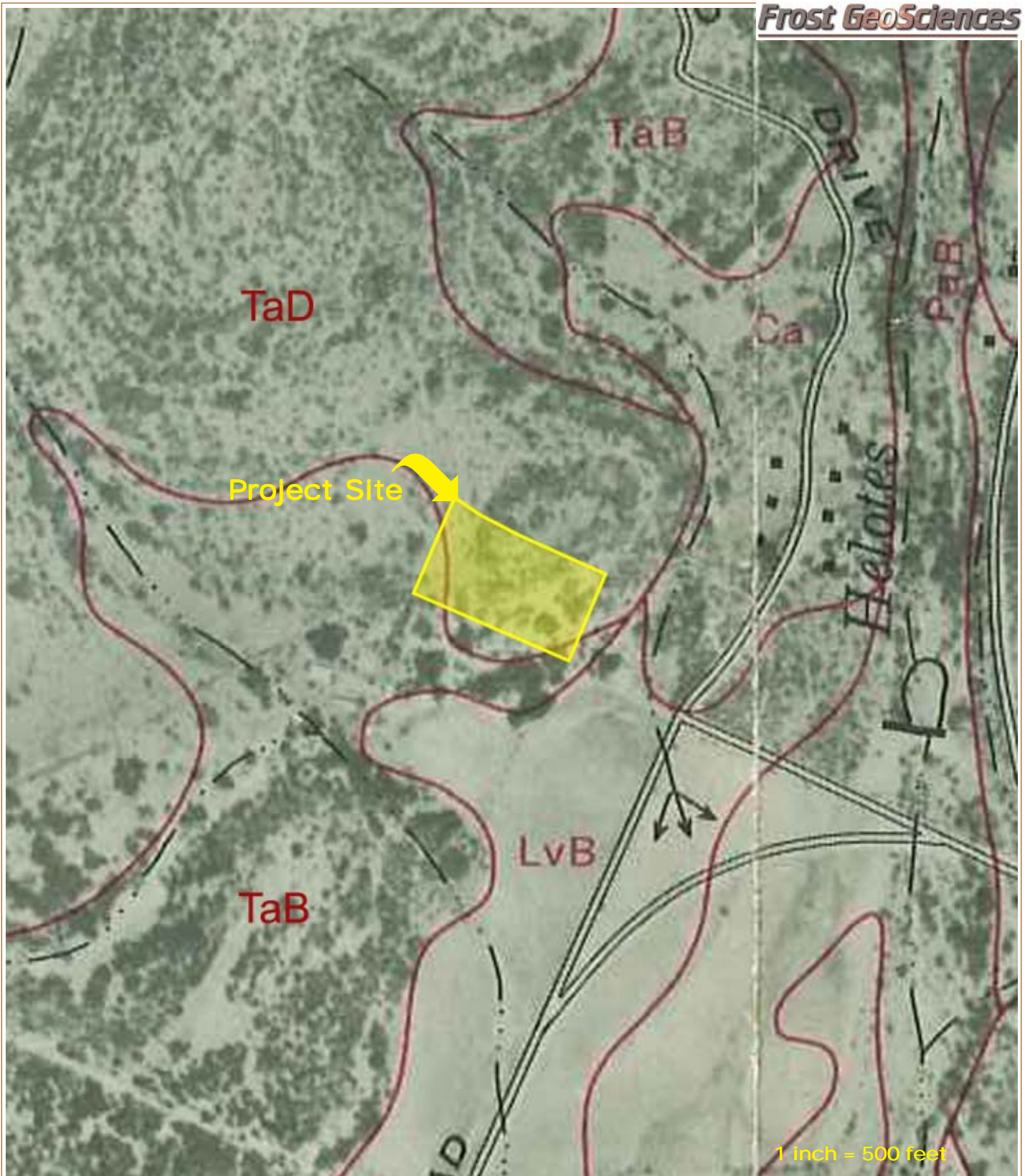
EAA-Edwards Aquifer Recharge and
Contributing Zone Map,
Helotes, Texas Quadrangle (2014)

PROJECT NO.:

FGS-E19173

DATE:

August 1, 2019



PROJECT NAME:

Geologic Site Assessment (WPAP)
for Regulated Activities / Development on the
Edwards Aquifer Recharge / Transition Zone
Helotes Townhomes Tract
Helotes, Texas

Soils Map

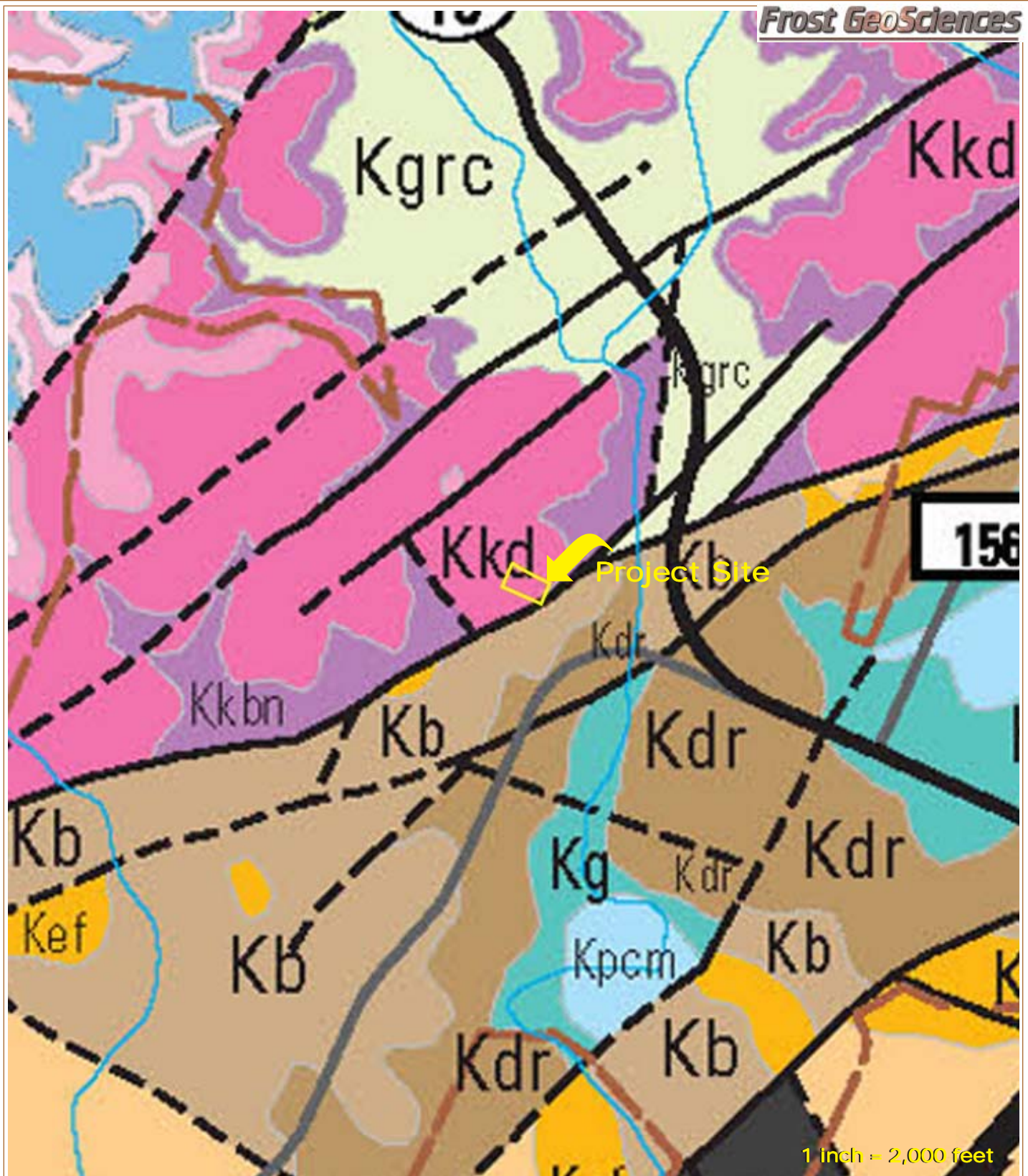
United States Department of Agriculture
Soil Survey of Bexar County, Texas (1966)

PROJECT NO.:

FGS-E19173

DATE:

August 1, 2019



PROJECT NAME:

Geologic Site Assessment (WPAP)
for Regulated Activities / Development on the
Edwards Aquifer Recharge / Transition Zone
Helotes Townhomes Tract
Helotes, Texas

United States Geological Survey
Scientific Investigations Map 3366
Dated: 2016

PROJECT NO.:

FGS-E19173

DATE:

August 1, 2019



PROJECT NAME:

Geologic Site Assessment (WPAP)
for Regulated Activities / Development on the
Edwards Aquifer Recharge / Transition Zone
Helotes Townhomes Tract
Helotes, Texas

2018 Aerial Photograph
Google Earth

PROJECT NO.:

FGS-E19173

DATE:

August 1, 2019



PROJECT NAME:
 Geologic Site Assessment (WPAP)
 for Regulated Activities / Development on the
 Edwards Aquifer Recharge / Transition Zone
 Helotes Townhomes Tract
 Helotes, Texas

2018 Aerial Photograph with PRFs
 Google Earth

PROJECT NO.: FGS-E19173

DATE: August 1, 2019

APPENDIX B
SITE PHOTOGRAPHS



Photo #1 – Typical view of the vegetative cover observed in the eastern portion of the project site.



Photo #2 – Typical view of the vegetative cover observed in the eastern portion of the project site.



Photo #3 – View of the dense vegetative cover observed in the northeast corner of the project site.



Photo #4 – View of the dense vegetative cover observed in the northern portion of the project site.



Photo #5 – View of the dense vegetative cover observed in the northwestern portion of the project site.



Photo #6 – View of the dense vegetative cover observed in the northwestern portion of the project site.



Photo #7 – Typical view of the vegetative cover in the western portion of the project site.



Photo #8 – Additional view of the vegetative cover observed in the western portion of the project site.



Photo #9 – Typical view of the vegetative cover in the southern portion of the project site.



Photo #10 – Additional view of the vegetative cover observed in the southern portion of the project site.



Photo #11 – View of PRF #S-1.



Photo #12 – View of the vegetative cover observed near PRF #S-1.



Photo #13 – View of PRF #S-2.



Photo #14 – View of the vegetative cover observed near PRF #S-2.



Photo #15 – View of PRF #S-3.



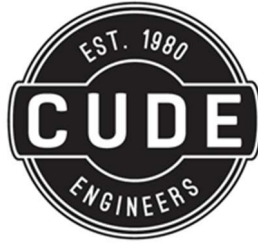
Photo #16 – View of the vegetative cover observed near PRF #S-3.



Photo #17 – View of PRF #S-4.



Photo #18 – View of the vegetative cover observed near PRF #S-4.



WPAP APPLICATION SECTION

Water Pollution Abatement Plan Application

Texas Commission on Environmental Quality

for Regulated Activities on the Edwards Aquifer Recharge Zone and Relating to 30 TAC §213.5(b), Effective June 1, 1999

To ensure that the application is administratively complete, confirm that all fields in the form are complete, verify that all requested information is provided, consistently reference the same site and contact person in all forms in the application, and ensure forms are signed by the appropriate party.

Note: Including all the information requested in the form and attachments contributes to more streamlined technical reviews.

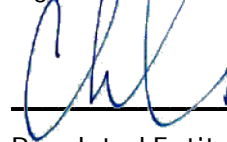
Signature

To the best of my knowledge, the responses to this form accurately reflect all information requested concerning the proposed regulated activities and methods to protect the Edwards Aquifer. This Water Pollution Abatement Plan Application Form is hereby submitted for TCEQ review and Executive Director approval. The form was prepared by:

Print Name of Customer/Agent: Chris R. Dice, P.E.

Date: 08-02-2019

Signature of Customer/Agent:



Regulated Entity Name: Iron Horse Townhomes

Regulated Entity Information

1. The type of project is:

- ☒ Residential: Number of Lots: 35
- ☐ Residential: Number of Living Unit Equivalents: _____
- ☐ Commercial
- ☐ Industrial
- ☐ Other: _____

2. Total site acreage (size of property): 5.09

3. Estimated projected population: 140

4. The amount and type of impervious cover expected after construction are shown below:

Table 1 - Impervious Cover Table

Impervious Cover of Proposed Project	Sq. Ft.	Sq. Ft./Acre	Acres
Structures/Rooftops	73,735	$\div 43,560 =$	1.69
Parking	25,731	$\div 43,560 =$	0.0.59
Other paved surfaces	530	$\div 43,560 =$	0.01
Total Impervious Cover	99,996	$\div 43,560 =$	2.30

Total Impervious Cover 2.30 \div Total Acreage 5.09 X 100 = 45.19% Impervious Cover

5. ☒ Attachment A - Factors Affecting Surface Water Quality. A detailed description of all factors that could affect surface water and groundwater quality that addresses ultimate land use is attached.
6. ☒ Only inert materials as defined by 30 TAC §330.2 will be used as fill material.

For Road Projects Only

Complete questions 7 - 12 if this application is exclusively for a road project.

7. Type of project:

- ☐ TXDOT road project.
☐ County road or roads built to county specifications.
☐ City thoroughfare or roads to be dedicated to a municipality.
☐ Street or road providing access to private driveways.

8. Type of pavement or road surface to be used:

- ☐ Concrete
☐ Asphaltic concrete pavement
☐ Other: _____

9. Length of Right of Way (R.O.W.): _____ feet.

Width of R.O.W.: _____ feet.

L x W = _____ Ft² \div 43,560 Ft²/Acre = _____ acres.

10. Length of pavement area: _____ feet.

Width of pavement area: _____ feet.

L x W = _____ Ft² \div 43,560 Ft²/Acre = _____ acres.

Pavement area _____ acres \div R.O.W. area _____ acres x 100 = _____ % impervious cover.

11. ☐ A rest stop will be included in this project.

☐ A rest stop will not be included in this project.

12. ☐ Maintenance and repair of existing roadways that do not require approval from the TCEQ Executive Director. Modifications to existing roadways such as widening roads/adding shoulders totaling more than one-half (1/2) the width of one (1) existing lane require prior approval from the TCEQ.

Stormwater to be generated by the Proposed Project

13. ☒ Attachment B - Volume and Character of Stormwater. A detailed description of the volume (quantity) and character (quality) of the stormwater runoff which is expected to occur from the proposed project is attached. The estimates of stormwater runoff quality and quantity are based on the area and type of impervious cover. Include the runoff coefficient of the site for both pre-construction and post-construction conditions.

Wastewater to be generated by the Proposed Project

14. The character and volume of wastewater is shown below:

<u>100%</u> Domestic	<u>8,400</u> Gallons/day
<u> </u> % Industrial	<u> </u> Gallons/day
<u> </u> % Commingled	<u> </u> Gallons/day
TOTAL gallons/day <u>8,400</u>	

15. Wastewater will be disposed of by:

☐ On-Site Sewage Facility (OSSF/Septic Tank):

☐ Attachment C - Suitability Letter from Authorized Agent. An on-site sewage facility will be used to treat and dispose of the wastewater from this site. The appropriate licensing authority's (authorized agent) written approval is attached. It states that the land is suitable for the use of private sewage facilities and will meet or exceed the requirements for on-site sewage facilities as specified under 30 TAC Chapter 285 relating to On-site Sewage Facilities.

☐ Each lot in this project/development is at least one (1) acre (43,560 square feet) in size. The system will be designed by a licensed professional engineer or registered sanitarian and installed by a licensed installer in compliance with 30 TAC Chapter 285.

☒ Sewage Collection System (Sewer Lines):

☐ Private service laterals from the wastewater generating facilities will be connected to an existing SCS.

☐ Private service laterals from the wastewater generating facilities will be connected to a proposed SCS.

☐ The SCS was previously submitted on .

☒ The SCS was submitted with this application.

☐ The SCS will be submitted at a later date. The owner is aware that the SCS may not be installed prior to Executive Director approval.

12. ☐ Maintenance and repair of existing roadways that do not require approval from the TCEQ Executive Director. Modifications to existing roadways such as widening roads/adding shoulders totaling more than one-half (1/2) the width of one (1) existing lane require prior approval from the TCEQ.

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☐ Private service laterals from the wastewater generating facilities will be connected to an existing SCS.

☐ Private service laterals from the wastewater generating facilities will be connected to a proposed SCS.

☐ The SCS was previously submitted on .

☒ The SCS was submitted with this application.

☐ The SCS will be submitted at a later date. The owner is aware that the SCS may not be installed prior to Executive Director approval.

☒ The sewage collection system will convey the wastewater to the Dos Rios WRC (name) Treatment Plant. The treatment facility is:

☒ Existing.

☐ Proposed.

16. ☒ All private service laterals will be inspected as required in 30 TAC §213.5.

Site Plan Requirements

Items 17 – 28 must be included on the Site Plan.

17. ☒ The Site Plan must have a minimum scale of 1" = 400'.

Site Plan Scale: 1" = 40'.

18. 100-year floodplain boundaries:

☐ Some part(s) of the project site is located within the 100-year floodplain. The floodplain is shown and labeled.

☒ No part of the project site is located within the 100-year floodplain.

The 100-year floodplain boundaries are based on the following specific (including date of material) sources(s): _____

19. ☒ The layout of the development is shown with existing and finished contours at appropriate, but not greater than ten-foot contour intervals. Lots, recreation centers, buildings, roads, open space, etc. are shown on the plan.

☐ The layout of the development is shown with existing contours at appropriate, but not greater than ten-foot intervals. Finished topographic contours will not differ from the existing topographic configuration and are not shown. Lots, recreation centers, buildings, roads, open space, etc. are shown on the site plan.

20. All known wells (oil, water, unplugged, capped and/or abandoned, test holes, etc.):

☐ There are _____ (#) wells present on the project site and the locations are shown and labeled. (Check all of the following that apply)

☐ The wells are not in use and have been properly abandoned.

☐ The wells are not in use and will be properly abandoned.

☐ The wells are in use and comply with 16 TAC §76.

☒ There are no wells or test holes of any kind known to exist on the project site.

21. Geologic or manmade features which are on the site:

☒ All sensitive geologic or manmade features identified in the Geologic Assessment are shown and labeled.

☐ No sensitive geologic or manmade features were identified in the Geologic Assessment.

☐ Attachment D - Exception to the Required Geologic Assessment. A request and justification for an exception to a portion of the Geologic Assessment is attached.

- 22. ☒ The drainage patterns and approximate slopes anticipated after major grading activities.
- 23. ☒ Areas of soil disturbance and areas which will not be disturbed.
- 24. ☒ Locations of major structural and nonstructural controls. These are the temporary and permanent best management practices.
- 25. ☒ Locations where soil stabilization practices are expected to occur.
- 26. ☐ Surface waters (including wetlands).
☒ N/A
- 27. ☐ Locations where stormwater discharges to surface water or sensitive features are to occur.
☒ There will be no discharges to surface water or sensitive features.
- 28. ☒ Legal boundaries of the site are shown.

Administrative Information

- 29. ☒ Submit one (1) original and one (1) copy of the application, plus additional copies as needed for each affected incorporated city, groundwater conservation district, and county in which the project will be located. The TCEQ will distribute the additional copies to these jurisdictions. The copies must be submitted to the appropriate regional office.
- 30. ☒ Any modification of this WPAP will require Executive Director approval, prior to construction, and may require submission of a revised application, with appropriate fees.



ATTACHMENT A – FACTORS AFFECTING SURFACE WATER QUALITY

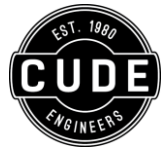
Potential sources of pollution that may reasonably be expected to affect the quality of storm water discharges from the site during construction include;

- Soil erosion due to site clearing and grading
- Oil, grease, fuel, and hydraulic fluid contamination from construction equipment and vehicle drippings
- Hydrocarbons from asphalt paving operations
- Concrete truck washout
- Miscellaneous trash and litter from construction workers and material wrappings

Potential sources of pollution that may reasonably be expected to affect the quality of storm water discharges from the site after development include;

- Oil, grease, fuel, and hydraulic fluid contamination from vehicle drippings
- Dirt and dust that may fall off vehicles
- Miscellaneous trash and litter

However BMP's, both temporary and permanent have been designed on the basis of the Technical Guidance manual to treat the required volume of storm water runoff.



ATTACHMENT B – VOLUME AND CHARACTER OF STORMWATER

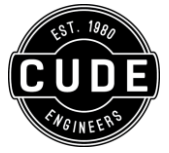
Storm water runoff generated from rooftops, streets, sidewalks, and landscape areas will be of a residential nature and may be saturated with small amounts of oil, grease, suspended solids, fertilizers and pesticides. Existing BMPs, both temporary and permanent, have been designed on the basis of the Technical Guidance manual to treat the required volume and character of storm water runoff to remove at least 80% of the increased TSS generated by the development.

To compute the existing, proposed and ultimate hydrology for this site, we utilized the Rational Method. The Rational Method was chosen because of the ease of use and drainage area size. In order to obtain the Time of Concentrations for each drainage area, the Seelye Chart was used to determine the overland (sheet) flow for a maximum of 300 feet. Maximum time for overland flow is 20 minutes and the minimum time is 5 minutes. For the shallow concentrated flow the TR-55 method was used. Channel flow was calculated at 6 feet per second over the length of the flow. The overall Time of Concentration is found by adding the overland flow, shallow concentrated flow, and the channel flow together.

The runoff coefficient (c-value) was found using the City of Helotes Unified Development Code (last updated in 2016), as a reference. The drainage area has many high points resulting in steeper slopes for much of the drainage shed. Slopes greater than 5% was assumed for all areas of the shed. For the existing undeveloped conditions a c-value of 0.75. For the proposed development, a c-value of 0.72, was used for average residential areas. The rainfall intensities were obtained from the Unified Development Code Table 504-2. The previously calculated time of concentration and c-values were used in the chart to determine the rainfall intensities for the 5, 10, 25, 100 year storm events.

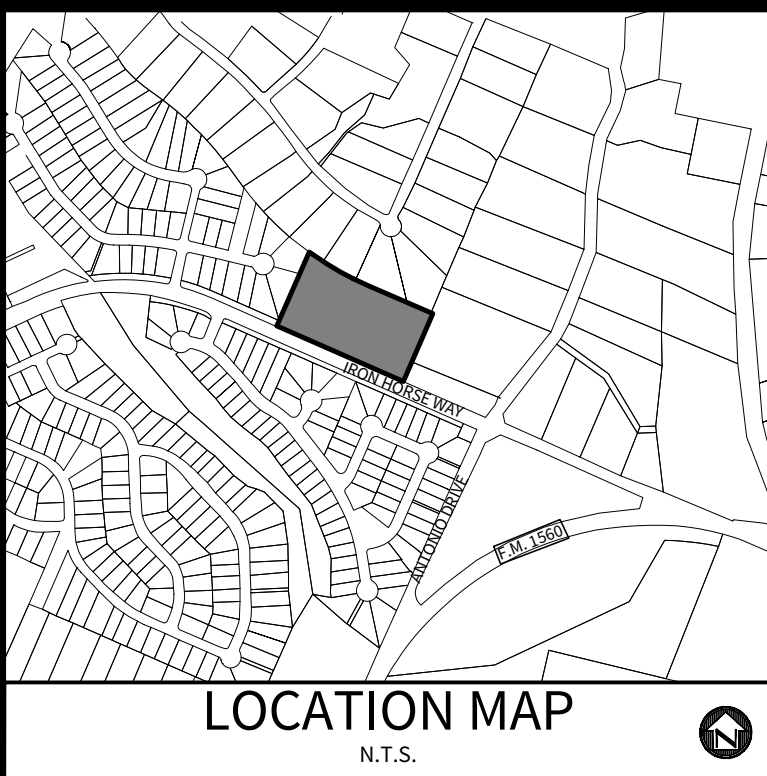
The site consists of natural ground with mostly tree cover. The site slopes towards the two natural lows 1) located on the south western boundary, and 2) on the southeastern boundary. Most of the site has slopes greater than 5%. There is a proposed 35 lots for 5.09 developable site acres, which yields a density of 6.88 lots per acre, and thus an average residential runoff coefficient value is acceptable. A copy of the master drainage map exhibit can be found in the Temporary Stormwater Section (attachment G) of this report. The drainage exhibit showing the proposed stormwater flows leaving the site for the 5, 10, 25 and 100 year storm events.

Most of the stormwater runoff will sheet flow into the street, curb inlets and proposed drainage channels that will release stormwater to existing low points within the property.



ATTACHMENT C – SUITABILITY LETTER FROM AUTHORIZED AGENT

No On-Site Sewage Facilities (OSSF) are proposed for this project.



GENERAL NOTES

1. SOIL DISTURBANCES WILL OCCUR OVER THE SITE UNLESS INDICATED OTHERWISE AS A "AREA OF UNDISTURBED SOIL."
2. LOCATIONS OF MAJOR STRUCTURAL AND NONSTRUCTURAL CONTROLS ARE LABELED. THESE ARE THE TEMPORARY AND PERMANENT BEST MANAGEMENT PRACTICES (B.M.P.'S).
3. SOIL STABILIZATION PRACTICES SHALL OCCUR OVER ALL DISTURBED AREAS WITH THE USE OF PAVEMENT, SIDEWALKS, GRASS SOD AND GRASS SEEDING.
4. THERE ARE NO LOCATIONS WHERE STORMWATER DISCHARGES DIRECTLY TO SURFACE WATER.
5. ALL STORMWATER DISCHARGING TO SENSITIVE FEATURES SHALL BE COVERED WITH GRASS SOD.
6. EACH LOT WILL BE RESPONSIBLE FOR ITS OWN TEMPORARY BMP.
7. CONSTRUCTION ENTRANCE/EXIT, WASHOUT PITS, AND STAGING AREAS MUST BE PLACED AT THE LOCATION WHERE THE PROJECT SITE IS BEING ACCESSED FOR CONSTRUCTION DURING VARIOUS PHASES.

TCEQ WPAP NOTES

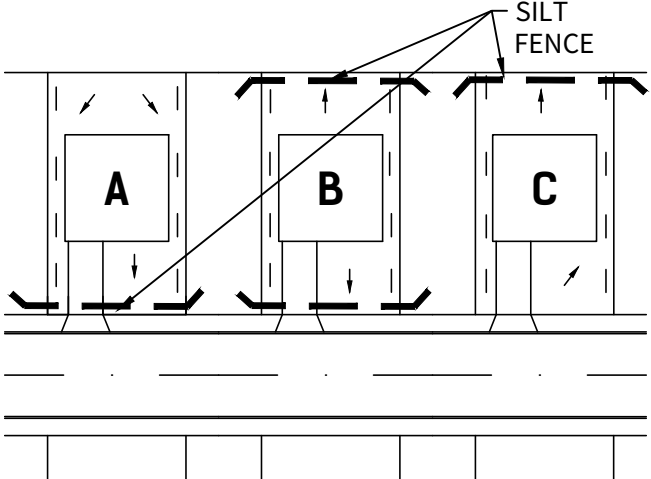
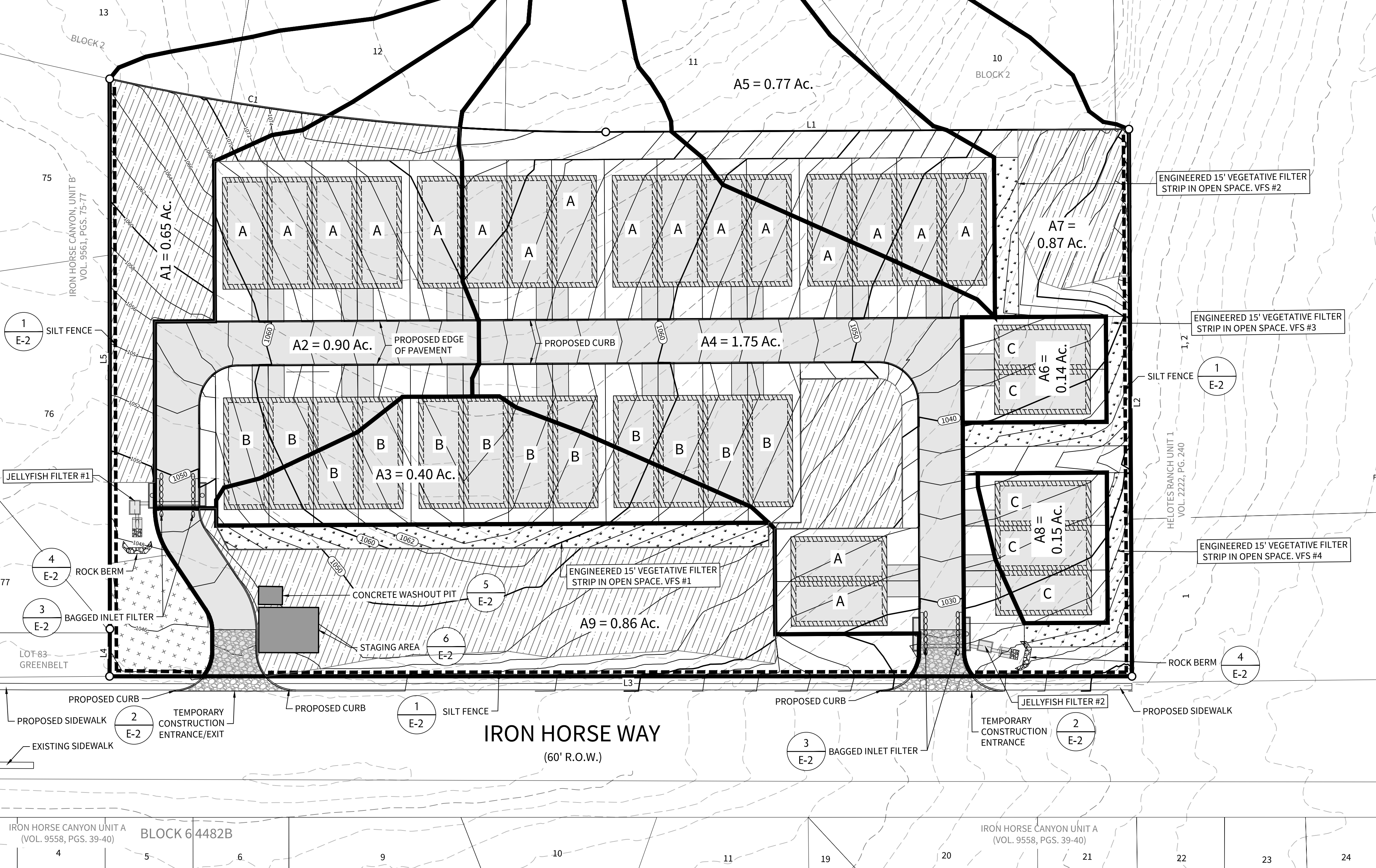
1. A written notice of construction must be submitted to the TCEQ regional office at least 48 hours prior to the start of any regulated activities. This notice must include:
 - the name of the approved project;
 - the activity start date; and
 - the contact information of the prime contractor.
2. All contractors conducting regulated activities associated with this project must be provided with complete copies of the approved Water Pollution Abatement Plan (WPAP) and the TCEQ letter indicating the specific conditions of its approval. During the course of these regulated activities, the contractors are required to keep on-site copies of the approved plan and approval letter.
3. If any sensitive feature(s) (caves, solution cavity, sink hole, etc.) is discovered during construction, all regulated activities near the sensitive feature must be suspended immediately. The appropriate TCEQ regional office must be immediately notified of any sensitive features encountered during construction. Construction activities may not be resumed until the TCEQ has reviewed and approved the appropriate protective measures in order to protect any sensitive feature and the Edwards Aquifer from potentially adverse impacts to water quality.
4. No temporary or permanent hazardous substance storage tank shall be installed within 150 feet of a water supply source, distribution system, well, or sensitive feature.
5. Prior to beginning any construction activity, all temporary erosion and sedimentation (E&S) control measures must be properly installed and maintained in accordance with the approved plans and manufacturers specifications. If inspections indicate a control has been used inappropriately, or incorrectly, the applicant must replace or modify the control for site situations. These controls must remain in place until the disturbed areas have been permanently stabilized.
6. Any sediment that escapes the construction site must be collected and properly disposed of before the next rain event to ensure it is not washed into surface streams, sensitive features, etc.
7. Sediment must be removed from the sediment traps or sedimentation basins not later than TCEQ-0592 (Rev. July 15, 2015) Page 2 of 2 when it occupies 50% of the basin's design capacity.
8. Litter, construction debris, and construction chemicals exposed to stormwater shall be prevented from being discharged offsite.
9. All spoils (excavated material) generated from the project site must be stored on-site with proper E&S controls. For storage or disposal of spoils at another site on the Edwards Aquifer Recharge Zone, the owner of the site must receive approval of a water pollution abatement plan for the placement of fill material or mass grading prior to the placement of spoils at the other site.
10. If portions of the site will have a temporary or permanent cease in construction activity lasting longer than 14 days, soil stabilization in those areas shall be initiated as soon as possible prior to the 14th day of inactivity. If activity will resume prior to the 21st day, stabilization measures are not required. If drought conditions or inclement weather prevent action by the 14th day, stabilization measures shall be initiated as soon as possible.
11. The following records shall be maintained and made available to the TCEQ upon request:
 - the dates when major grading activities occur;
 - the dates when construction activities temporarily or permanently cease on a portion of the site; and
 - the dates when stabilization measures are initiated.
12. The holder of any approved Edward Aquifer protection plan must notify the appropriate regional office in writing and obtain approval from the executive director prior to initiating any of the following:
 - A. any physical or operational modification of any water pollution abatement structure(s), including but not limited to ponds, dams, berms, sewage treatment plants, and diversionary structures;
 - B. any change in the nature or character of the regulated activity from that which was originally approved or a change which would significantly impact the ability of the plan to prevent pollution of the Edwards Aquifer;
 - C. any development of land previously identified as undeveloped in the original water pollution abatement plan.

Austin Regional Office
12100 Park 35 Circle, Building A
Austin, Texas 78753-1808
Phone (512) 339-2929
Fax (512) 339-3795

San Antonio Regional Office
14250 Judson Road
San Antonio, Texas 78233-4480
Phone (210) 490-3096
Fax (210) 545-4329

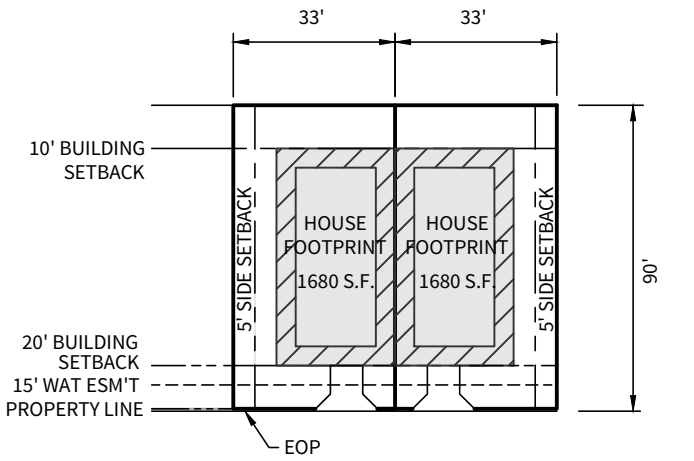
LINE TABLE			
LINE	BEARING	LENGTH	
L1	S66°32'01"E	327.54'	
L2	S23°16'25"W	342.55'	
L3	N60°16'39"W	639.88'	
L4	N23°57'23"E	29.73'	
L5	N23°41'33"E	344.31'	

CURVE TABLE					
CURVE	RADIUS	DELTA	LENGTH	CHORD	CHORD BEARING
C1	1400.00'	12°40'23"	238.40'	311.46'	S60°12'06"E



TYPICAL LOT SITE PLAN

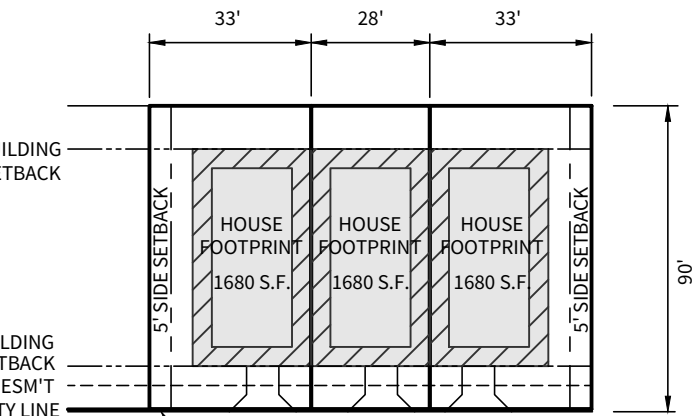
N.T.S.



DUPLEX

NOT TO SCALE

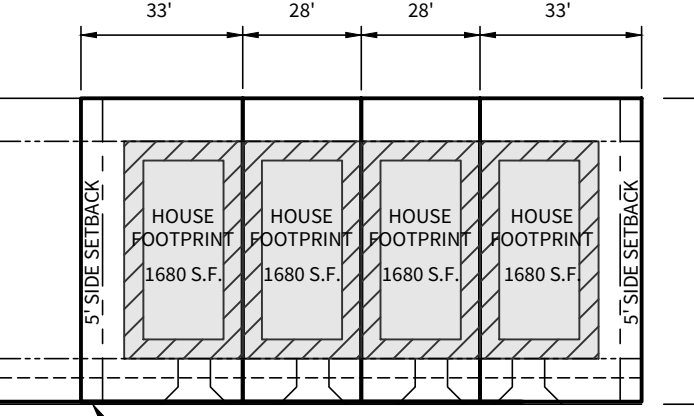
AVERAGE IMPERVIOUS COVER:
- ROOFTOP = 3,360 SQ. FT.
- DRIVEWAY = 400 SQ. FT.
TOTAL: 3,760 SQ. FT.



TRIPLEX

NOT TO SCALE

AVERAGE IMPERVIOUS COVER:
- ROOFTOP = 5,360 SQ. FT.
- DRIVEWAY = 400 SQ. FT.
TOTAL: 5,760 SQ. FT.



QUADPLEX

NOT TO SCALE

AVERAGE IMPERVIOUS COVER:
- ROOFTOP = 6,720 SQ. FT.
- DRIVEWAY = 800 SQ. FT.
TOTAL: 7,520 SQ. FT.

LEGEND

EXISTING CONTOUR

PROPOSED CONTOUR

BAGGED GRAVEL INLET FILTER

SILT FENCE

DRAINAGE AREA

DRAINAGE AREA NUMBER

ROCK BERM

TEMPORARY CONSTRUCTION ENTRANCE / EXIT

STAGING AREA

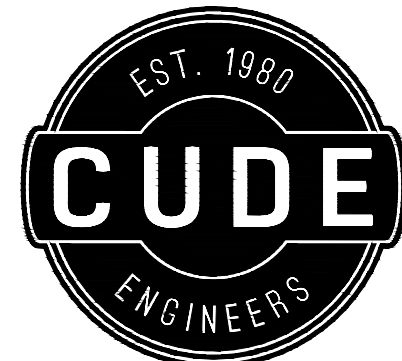
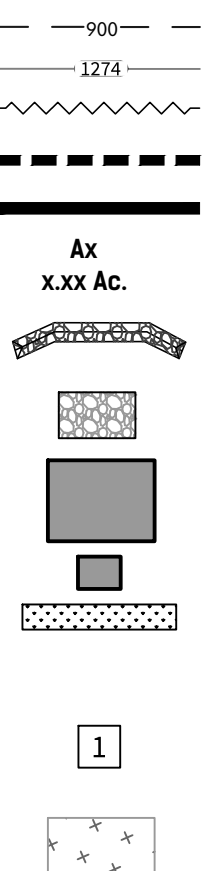
CONCRETE WASHOUT PIT

PROPOSED ENGINEERED VEGETATIVE STRIPS

#

E2

UNDISTURBED SOIL AREA



4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

IRONHORSE TOWNHOMES

WATER POLLUTION ABATEMENT PLAN

DATE

08/02/2019

PROJECT NO.

03404.00

DRAWN BY

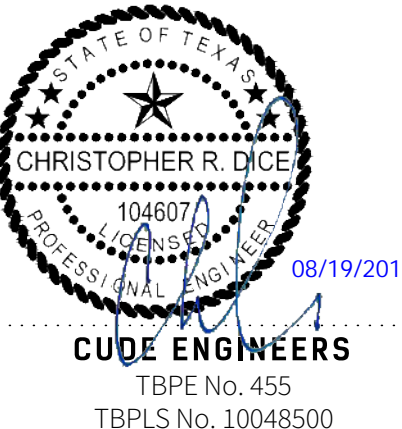
JC/PL/SG/JC

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JC/DDC

REVISIONS

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CUDE ENGINEERS

TBPE No. 455
TBPLS No. 10048500

E1

<div><div><div><div><div><div>STEEL FENCE POST MAX. 5' SPACING</div><div>WOVEN WIRE FABRIC (HOG WIRE) 12.5 GA.</div><div>FABRIC TOE-IN</div></div><div><div>GEOTEXTILE FABRIC</div><div>TRENCH BACKFILL</div><div>FLOW</div></div></div><div><div>PLAN</div></div></div><div><div><div>36"</div><div>12"</div><div>6"</div></div><div><div>STEEL POST</div><div>HOG WIRE</div><div>GEOTEXTILE FABRIC</div><div>TRENCH BACKFILL</div></div></div><div><div>SECTION</div></div></div><div><div>NOTES:</div><div><div><div>1. SILT FENCE MATERIAL SHOULD BE POLYPROPYLENE, POLYETHYLENE OR POLYAMIDE WOVEN OR NON WOVEN FABRIC. THE FABRIC WIDTH SHOULD BE 36 INCHES, WITH A MINIMUM UNIT WEIGHT OF 4.5 OZ/YD, MULLEN BURST STRENGTH EXCEEDING 190 LB/IN 2, ULTRAVIOLET STABILITY EXCEEDING 70%, AND MINIMUM APPARENT OPENING SIZE OF U.S. SIEVE NO. 30.</div><div>2. FENCE POSTS SHOULD BE MADE OF HOT ROLLED STEEL, AT LEAST 4 FEET LONG WITH TEE OR Y-BAR CROSS SECTION, SURFACE PAINTED OR GALVANIZED, MINIMUM NOMINAL WEIGHT 1.25 LB/FT 2, AND BRINDELL HARDNESS EXCEEDING 140.</div><div>3. WOVEN WIRE BACKING TO SUPPORT THE FABRIC SHOULD BE GALVANIZED 2" X 4" WELDED WIRE, 12.5 GAUGE MINIMUM.</div><div>4. STEEL POSTS, WHICH SUPPORT THE SILT FENCE, SHOULD BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. POST MUST BE EMBEDDED A MINIMUM OF 1 FOOT DEEP AND SPACED NOT MORE THAN 5 FEET ON CENTER.</div><div>5. LAY OUT FENCING DOWN-SLOPE OF DISTURBED AREA, FOLLOWING THE CONTOUR AS CLOSELY AS POSSIBLE. THE FENCE SHOULD BE SITED SO THAT THE MAXIMUM DRAINAGE AREA IS ¼ ACRE/100 FEET OF FENCE.</div><div>6. THE TOE OF THE SILT FENCE SHOULD BE TRENCHED IN WITH A SPADE OR MECHANICAL TRENCHER, SO THAT THE DOWN-SLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW. WHERE FENCE CANNOT BE TRENCHED IN (E.G., PAVEMENT OR ROCK OUTCROP), WEIGHT FABRIC FLAP WITH 3 INCHES OF PEA GRAVEL ON UPHILL SIDE TO PREVENT FLOW FROM SEEPING UNDER FENCE.</div><div>7. THE TRENCH MUST BE A MINIMUM OF 6 INCHES DEEP AND 6 INCHES WIDE TO ALLOW FOR THE SILT FENCE FABRIC TO BE LAID IN THE GROUND AND BACKFILLED WITH COMPACTED MATERIAL.</div><div>8. SILT FENCE SHOULD BE SECURELY FASTENED TO EACH STEEL SUPPORT POST OR TO WOVEN WIRE, WHICH IS IN TURN ATTACHED TO THE STEEL FENCE POST. THERE SHOULD BE A 3-FOOT OVERLAP, SECURELY FASTENED WHERE ENDS OF FABRIC MEET.</div><div>9. SILT FENCE SHOULD BE REMOVED WHEN THE SITE IS COMPLETELY STABILIZED SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.</div><div>10. REMOVE SEDIMENT WHEN BUILDUP REACHES 6 INCHES, OR INSTALL A SECOND LINE OF FENCING PARALLEL TO THE OLD FENCE.</div><div>11. REPLACE ANY TORN FABRIC OR INSTALL A SECOND LINE OF FENCING PARALLEL TO THE TORN SECTION.</div><div>12. REPLACE OR REPAIR ANY SECTIONS CRUSHED OR COLLAPSED IN THE COURSE OF CONSTRUCTION ACTIVITY. IF A SECTION OF FENCE IS OBSTRUCTING VEHICULAR ACCESS, CONSIDER RELOCATING IT TO A SPOT WHERE IT WILL PROVIDE EQUAL PROTECTION, BUT WILL NOT OBSTRUCT VEHICLES. A TRIANGULAR FILTER DIKE MAY BE PREFERABLE TO A SILT FENCE AT COMMON VEHICLE ACCESS POINTS.</div></div></div></div><div><div>1</div><div><div>SILT FENCE DETAIL</div><div>SCALE: NONE</div></div></div></div>		<div><div><div><div><div>EXISTING GROUND</div><div>50' MIN</div><div>SEPERATION GEOTEXTILE FABRIC FOR FULL WIDTH AND LENGTH OF EXIT</div><div>PROFILE</div><div>GRADED TO PREVENT RUN-OFF FROM LEAVING SITE</div></div><div><div>EXISTING GROUND</div><div>50' MIN</div><div>15' MIN</div><div>COARSE AGGREGATE</div><div>PLAN VIEW</div><div>EXISTING CONCRETE APRON</div><div>PUBLIC RIGHT-OF-WAY</div><div>PROVIDE APPROPRIATE TRANSITION BETWEEN STABILIZED CONSTRUCTION ENTRANCE AND PUBLIC RIGHT-OF-WAY</div></div></div><div><div>GENERAL NOTES</div><div><div>1. LENGTH SHALL BE AS SHOWN ON THE CONSTRUCTION DRAWINGS BUT NOT LESS THAN 50 FEET.</div><div>2. THICKNESS SHALL BE NOT LESS THAN 8 INCHES.</div><div>3. WIDTH SHALL BE NOT LESS THAN FULL WIDTH OF ALL POINTS OF INGRESS OR EGRESS.</div><div>4. STABILIZED AREA MAY BE WIDENED OR LENGTHENED TO ACCOMMODATE A TRUCK WASHING AREA WHEN SHOWN ON THE CONSTRUCTION DRAWING. AN OUTLET SEDIMENT TRAP MUST BE PROVIDED FOR THE TRUCK WASHING AREA.</div><div>5. STONE MATERIAL SHALL CONSIST OF 3 TO 5 INCH OPEN GRADED ROCK AND SHALL BE PLACED IN A LAYER OF AT LEAST 8 INCHES THICKNESS.</div></div></div></div><div><div>NOTES:</div><div><div><div>1. THE AGGREGATE SHOULD CONSIST OF 4 TO 8 INCH WASHED STONE OVER A STABLE FOUNDATION.</div><div>2. THE AGGREGATE SHOULD BE PLACED WITH A MINIMUM THICKNESS OF 8 INCHES.</div><div>3. THE GEOTEXTILE FABRIC SHOULD BE DESIGNED SPECIFICALLY FOR USE AS A SOIL FILTRATION MEDIA WITH AN APPROXIMATE WEIGHT OF 6 OZ/YD 2, A MULLEN BURST RATING OF 140 LB/IN 2, AND AN EQUIVALENT OPENING SIZE GREATER THAN A NUMBER 50 SIEVE.</div><div>4. THE MINIMUM WIDTH OF THE ENTRANCE/EXIT SHOULD BE 12 FEET OR THE FULL WIDTH OF EXIT ROADWAY, WHICHEVER IS GREATER.</div><div>5. THE CONSTRUCTION ENTRANCE SHOULD BE AT LEAST 50 FEET LONG.</div><div>6. PLACE GEOTEXTILE FABRIC AND GRADE FOUNDATION TO IMPROVE STABILITY, ESPECIALLY WHERE WET CONDITIONS ARE ANTICIPATED.</div><div>7. PLACE STONE TO DIMENSIONS AND GRADE SHOWN. LEAVE SURFACE SMOOTH AND SLOPE FOR DRAINAGE.</div><div>8. THE ENTRANCE SHOULD BE MAINTAINED IN A CONDITION, WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.</div><div>9. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ON TO PUBLIC RIGHTS-OF-WAY SHOULD BE REMOVED IMMEDIATELY BY CONTRACTOR.</div><div>10. WHEN NECESSARY, WHEELS SHOULD BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHT-OF-WAY.</div><div>11. WHEN WASHING IS REQUIRED, IT SHOULD BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE THAT DRAINS INTO AN APPROVED SEDIMENT TRAP OR SEDIMENT BASIN.</div><div>12. ALL SEDIMENT SHOULD BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATER COURSE.</div></div></div></div><div><div>2</div><div><div>TEMPORARY CONSTRUCTION ENTRANCE / EXIT</div><div>SCALE: NONE</div></div></div></div>	<div><div><div><div><div>ELEVATION</div><div>GRATE DRAIN INLET</div><div>SAND BAGS w/ WASHED PEA GRAVEL FILLER</div><div>PLAN</div><div>SAND BAGS w/ WASHED PEA GRAVEL FILLER</div><div>OVERFLOW</div><div>SAND BAGS w/ WASHED PEA GRAVEL FILLER</div><div>SECTION</div><div>GRATE DRAIN INLET</div><div>CURB INLET</div><div>1 1/2"</div><div>1 1/2"</div><div>CURB INLET</div></div></div><div><div>BAGGED GRAVEL INLET FILTER NOTES</div><div><div>1. THE GRAVEL BAG MATERIAL SHOULD BE POLYPROPYLENE, POLYETHYLENE, POLYAMIDE OR COTTON BURLAP WOVEN FABRIC, MINIMUM UNIT WEIGHT 4 OZ/YD 2, MULLEN BURST STRENGTH EXCEEDING 300 PSI AND ULTRAVIOLET STABILITY EXCEEDING 70 PERCENT.</div><div>2. THE BAG LENGTH SHOULD BE 24 INCHES, WIDTH SHOULD BE 18 INCHES AND THICKNESS SHOULD BE 6 INCHES.</div><div>3. THE GRAVEL BAGS SHOULD BE FILLED WITH 3/4" GRAVEL.</div><div>4. WHEN A GRAVEL BAG IS FILLED WITH GRAVEL, THE OPEN END OF THE GRAVEL BAG SHOULD BE STAPLED OR TIED WITH NYLON OR POLY CORD.</div><div>5. THE GRAVEL BAGS SHOULD BE PLACED AS SHOWN ON THE DETAIL. THE GRAVEL BAGS SHALL BE STACKED TO FORM A CONTINUOUS BARRIER AROUND THE INLETS. THE BAGS SHOULD BE TIGHTLY ABUTTED AGAINST EACH OTHER TO PREVENT RUNOFF FROM FLOWING BETWEEN THE BAGS.</div><div>6. INSPECTION SHOULD BE MADE WEEKLY AND AFTER EACH RAINFALL. REPAIR OR REPLACEMENT SHOULD BE MADE PROMPTLY AS NEEDED BY THE CONTRACTOR.</div><div>7. CHECK PLACEMENT OF DEVICE TO PREVENT GAPS BETWEEN DEVICE AND CURB.</div><div>8. REMOVE SEDIMENT WHEN BUILDUP REACHES A DEPTH OF 3 INCHES. REMOVED SEDIMENT SHOULD BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.</div><div>9. STRUCTURES SHOULD BE REMOVED AND THE AREA STABILIZED ONLY AFTER THE REMAINING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.</div></div></div></div><div><div>3</div><div><div>BAGGED GRAVEL INLET FILTER</div><div>SCALE: NONE</div></div></div></div>	<div><div><div><div><div>ISOMETRIC PLAN</div><div>FLOW</div><div>N.T.S.</div><div>WOVEN WIRE SHEATHING</div><div>24"</div><div>12" MIN</div><div>3 TO 4 INCHES</div><div>SECTION</div><div>WOVEN WIRE SHEATHING</div><div>FLOW</div></div></div><div><div>NOTES:</div><div><div><div>1. THE BERM STRUCTURE SHOULD BE SECURED WITH A WOVEN WIRE SHEATHING HAVING MAXIMUM OPENING OF 1 INCH AND A MINIMUM WIRE DIAMETER OF 20 GAUGE GALVANIZED AND SHOULD BE SECURED WITH SHOT RINGS.</div><div>2. CLEAN, OPEN GRADED 3 TO 5-INCH DIAMETER ROCK SHOULD BE USED, EXCEPT IN AREAS WHERE HIGH VELOCITIES OR LARGE VOLUMES OF FLOW ARE EXPECTED, WHERE 5-TO 8-INCH DIAMETER ROCKS MAY BE USED.</div><div>3. LAY OUT THE WOVEN WIRE SHEATHING PERPENDICULAR TO THE FLOW LINE.</div><div>4. BERM SHOULD HAVE A TOP WIDTH OF 2 FEET MINIMUM WITH SIDE SLOPES BEING 2:1 (H:V) OR FLATTER.</div><div>5. PLACE THE ROCK ALONG THE SHEATHING TO A HEIGHT NOT LESS THAN 18".</div><div>6. WRAP THE WIRE SHEATHING AROUND THE ROCK AND SECURE WITH TIE WIRE SO THAT THE ENDS OF THE SHEATHING OVERLAP AT LEAST 2 INCHES, AND THE BERM RETAINS ITS SHAPE WHEN WALKED UPON.</div><div>7. BERM SHOULD BE BUILT ALONG THE CONTOUR AT ZERO PERCENT GRADE OR AS NEAR AS POSSIBLE.</div><div>8. THE ENDS OF THE BERM SHOULD BE TIED INTO EXISTING UPSLOPE GRADE AND THE BERM SHOULD BE BURIED IN A TRENCH APPROXIMATELY 3 TO 4 INCHES DEEP TO PREVENT FAILURE OF THE CONTROL.</div><div>9. INSPECTION SHOULD BE MADE WEEKLY AND AFTER EACH RAINFALL BY THE RESPONSIBLE PARTY. FOR INSTALLATIONS IN STREAMBEDS, ADDITIONAL DAILY INSPECTIONS SHOULD BE MADE. THE BERM SHOULD BE RESHAPED AS NEEDED DURING INSPECTION.</div><div>10. REMOVE SEDIMENT AND OTHER DEBRIS WHEN BUILDUP REACHES 6 INCHES AND DISPOSE OF THE ACCUMULATED SILT OF IN AN APPROVED MANNER AND REPAIR ANY LOOSE WIRE SHEATHING.</div><div>11. THE BERM SHOULD BE REPLACED WHEN THE STRUCTURE CEASES TO FUNCTION AS INTENDED DUE TO SILT ACCUMULATION AMONG THE ROCKS, WASHOUT, CONSTRUCTION TRAFFIC DAMAGE, ETC.</div><div>12. THE ROCK BERM SHOULD BE LEFT IN PLACE UNTIL ALL UPSTREAM AREAS ARE STABILIZED AND ACCUMULATED SILT REMOVED.</div></div></div></div><div><div>4</div><div><div>ROCK BERM DETAIL</div><div>SCALE: NONE</div></div></div></div></div>
<div><div><div><div><div>VEHICULAR ACCESS FOR CONSTRUCTION</div><div>10 MIL PLASTIC LINING</div><div>SAND BAGS</div><div>BERM</div><div>PLAN</div><div>VARIES</div><div>SECTION A-A</div><div>12"</div></div></div><div><div>NOTES:</div><div><div><div>1. DETAIL ABOVE ILLUSTRATES MINIMUM DIMENSIONS. PIT CAN BE INCREASED IN SIZE DEPENDING ON EXPECTED FREQUENCY OF USE.</div><div>2. WASHOUT PIT SHALL BE LOCATED IN AN AREA EASILY ACCESSIBLE TO CONSTRUCTION TRAFFIC.</div><div>3. WASHOUT PIT SHALL NOT BE LOCATED IN AREAS SUBJECT TO INUNDATION FROM STORM WATER RUNOFF.</div></div></div></div><div><div>5</div><div><div>CONCRETE TRUCK WASHOUT PIT</div><div>SCALE: NONE</div></div></div></div></div>	<div><div><div><div><div>CONSTRUCTION EQUIPMENT & VEHICLE STORAGE AND MAINTENANCE AREA</div><div>CONSTRUCTION AND WASTE MATERIAL STORAGE AREA</div><div>FIELD OFFICE</div><div>ENTRANCE / EXIT</div><div>LEGEND</div><div><div>SILT FENCE</div><div>FLOW ARROWS</div></div><div>NOTE: CONTRACTOR SHALL ADJUST STORM WATER POLLUTION PREVENTION PLAN CONTROLS AS NECESSARY TO PROMOTE EROSION CONTROL IN AND AROUND DESIGNATED STAGING AREA.</div></div></div><div><div>6</div><div><div>TYP. CONSTRUCTION STAGING AREA</div><div>SCALE: NONE</div></div></div></div></div>			

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9.

STATE OF TEXAS

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CHRISTOPHER R. DICE

104607

Professional Engineer

08/19/2019

CUDE ENGINEERS

TBPE No. 455

TBPLS No. 10048500

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STATE OF TEXAS

SEAL

CHRISTOPHER R. DICE

104607

08/19/2019

CUDE ENGINEERS

TBPE No. 455

TBPLS No. 10048500

E2

2 OF 3

Arkansas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: **IRON HORSE TOWNHOMES**
 Date Prepared: **7/24/2019**

Additional Information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cell. Text shown in blue indicate location of instructions in the Technical Guidance Manual - RG-348.
Characters shown in red are data entry fields.
Characters shown in black (BOLD) are calculated fields. Changes to these fields will remove the equations used in the spreadsheet.

1. The Required Load Reduction for the total project: Calculations From RG-348 Pages 3-27 to 3-30

Page 3-29 Equation 3-3: $L_d = 27 \cdot A_{\text{tot}} \cdot P$

where: L_d **TOTAL PROJECT** = Required TSS removal resulting from the proposed development = 80% of increased load
 A_{tot} = Net increase in impervious area for the project
 P = Average annual precipitation, inches

Site Data: Determine Required Load Removal Based on the Entire Project

County =	Bexar	
Total project area included in plan =	5.09	acres
Predevelopment impervious area within the limits of the plan =	0.03	acres
Total post-development impervious area within the limits of the plan =	2.27	acres
Total post-development impervious cover fraction =	0.45	
P =	30	inches
L_d TOTAL PROJECT	1833	lbs

* The values entered in these fields should be for the total project area.

Number of drainage basins / outfalls areas leaving the plan area = 9

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. =	3	
Total drainage basin/outfall area =	0.40	acres
Predevelopment impervious area within drainage basin/outfall area =	0.29	acres
Post-development impervious area within drainage basin/outfall area =	0.73	
Post-development impervious fraction within drainage basin/outfall area =	248	lbs

L_d **INDIVID BASINS**

3. Indicate the proposed BMP code for this basin.

Proposed BMP = **Vegetated Filter Strips**
 Removal efficiency = 85 percent

4. Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3-7: $L_R = (\text{BMP efficiency}) \times P \times (A_d + 3A_o + 0.5A_p)$

where: A_d = Total On-Site drainage area in the BMP catchment area
 A_o = Impervious area proposed in the BMP catchment area
 A_p = Pervious area remaining in the BMP catchment area
 L_R = TSS Load removed from this catchment area by the proposed BMP

A_d =	0.40	acres
A_o =	0.29	acres
A_p =	0.11	acres
L_R =	259	lbs

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

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Project Name: **IRON HORSE TOWNHOMES**

Date Prepared: **7/24/2019**

1. The Required Load Reduction for the total project:

Calculations from RG-348

Pages 3-27 to 3-30

Page 3-29 Equation 3.3: $L_d = 27.2(A_{\text{On}} \times P)$

where: L_d TOTAL PROJECT = Required TSS removal resulting from the proposed development = 80% of increased load

A_{On} = Net increase in impervious area for the project

P = Average annual precipitation, inches

Site Data: Determine Required Load Removal Based on the Entire Project

County = **Bexar** ▲

Total project area included in plan = **2.7** acres

Predevelopment impervious area within the limits of the plan = **0.03** acres

Total post-development impervious area within the limits of the plan = **2.27** acres

Total post-development impervious cover fraction = **0.83**

P = **30** inches

L_d TOTAL PROJECT = **1833** lbs ▲

The values entered in these fields should be for the total project area.

Number of drainage basins / outfalls areas leaving the plan area = **9** ▲

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. = **5** ▲

Total drainage basin/outfall area = **0.28** acres

Predevelopment impervious area within drainage basin/outfall area = **0.00** acres

Post-development impervious area within drainage basin/outfall area = **0.16** acres

Post-development impervious fraction within drainage basin/outfall area = **0.54**

L_d PER BASIN = **127** lbs ▲

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = **Vegetated Filter Strips**

Removal efficiency = **85** percent

4. Calculate Maximum TSS Load Removed (L_r) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3.7: $L_r = (\text{BMP efficiency}) \times P \times (A_{\text{On}} + 34.6 \times A_{\text{On}} \times 0.54)$

where: A_{On} = Total On-Site drainage area in the BMP catchment area

L_r = Impervious area proposed in the BMP catchment area

A_{On} = Pervious area remaining in the BMP catchment area

L_r = TSS Load removed from this catchment area by the proposed BMP

A_{On} = **0.28** acres

A_{On} = **0.16** acres

A_{On} = **0.13** acres

L_r = **139** lbs ▲

Water Quality Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: **IRON HORSE TOWNHOMES**
Date Prepared: **7/24/2019**

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The Required Load Reduction for the total project:

Calculations from RG-348 Pages 3-27 to 3-30

Page 3-29 Equation 3.3: $L_d = 27.2(A_{IUP} \times P)$

where: L_d TOTAL PROJECT = Required TSS removal resulting from the proposed development = 80% of increased load
 A_{IUP} = Net increase in impervious area for the project
 P = Average annual precipitation, inches

Site Data: Required Required Load Removal Based on the Entire Project

County =	Bexar	↕
Total project area included in plan =	5.09	acres
Preadevelopment impervious area within the limits of the plan =	0.03	acres
Total post-development impervious area within the limits of the plan =	2.27	acres
Total post-development impervious cover fraction =	0.45	
P =	30	inches

L_d TOTAL PROJECT = **1933 lbs.**

The values entered in these fields should be for the total project area.

Number of drainage basins / outfalls areas leaving the plan area = **9**

Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. =	6	↕
Total drainage basin/outfall area =	0.14	acres
Preadevelopment impervious area within drainage basin/outfall area =	0.00	acres
Post-development impervious area within drainage basin/outfall area =	0.08	acres
Post-development impervious fraction within drainage basin/outfall area =	0.59	
L_d THIS BASIN =	65	lbs.

Indicate the proposed BMP Code for this basin.

Proposed BMP = **Vegetated Filter Strips**
Removal efficiency = **85**

Calculate Maximum TSS Load Removed (L_{dR}) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3.7: $L_{dR} = (\text{BMP efficiency}) \times P \times (A_{IUP} + 34.6 + A_{IUP} \times 0.54)$

where: A_{IUP} = Total On-Site drainage area in the BMP catchment area
 A_{IUP} = Impervious area proposed in the BMP catchment area
 A_{IUP} = Perennial area remaining in the BMP catchment area
 L_{dR} = TSS Load removed from this catchment area by the proposed BMP

A_{IUP} =	0.14	acres
A_{IUP} =	0.08	acres
A_{IUP} =	0.06	acres
L_{dR} =	74	lbs.

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: **Gombert Tract Subdivision**
Date Prepared: **7/24/2019**

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1. The Required Load Reduction for the total project; Calculations from RG-348 Pages 3-27 to 3-30

Page 3-29 Equation 3.3: $L_{\text{eq}} = 27.2(A_{\text{eq}} \times P)$

where: L_{eq} TOTAL PROJECT = Required TSS removal resulting from the proposed development = 80% of increased load
 A_{eq} = Net increase in impervious area for the project
 P = Average annual precipitation, inches

Site Data: Determine Required Load Removal from the Entire Project

County =	Bexar	acres
Total project area included in plan =	5.89	acres
Predevelopment impervious area within the limits of the plan =	0.03	acres
Total post-development impervious area within the limits of the plan =	2.27	acres
Total post-development impervious cover fraction =	0.35	acres
P =	30	inches

L_{eq} TOTAL PROJECT = **1833** lbs.

* The values entered in these fields should be for the total project area.

Number of drainage basins / outfalls areas leaving the plan area = **9**

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. is **8**

		acres
Total drainage basin/outfall area =	0.15	acres
Predevelopment impervious area within drainage basin/outfall area =	0.01	acres
Post-development impervious area within drainage basin/outfall area =	0.11	acres
Post-development impervious fraction within drainage basin/outfall area =	0.73	
L_{eq} DRAIN BASIN =	85	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = **Vegetated Filter Strips**
Removal efficiency = **85** percent

4. Calculate Maximum TSS Load Removed (L_{R}) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3.7: $L_{\text{R}} = (\text{BMP efficiency}) \times P \times (A_1 \times 34.6 + A_2 \times 0.54)$

where: A_1 = Total On-Site drainage area in the BMP catchment area
 A_2 = Impervious area proposed in the BMP catchment area
 P = Perious area remaining in the BMP catchment area
 L_{R} = TSS Load removed from this catchment area by the proposed BMP

A_1 =	0.15	acres
A_2 =	0.11	acres
A_3 =	0.04	acres
L_{R} =	97	lbs.

<p>Water Commission on Environmental Quality</p> <p>TSS Removal Calculations 04-20-2009</p>		<p>Project Name: IRON HORSE TOWNHOMES</p> <p>Date Prepared: 7/24/2019</p>	
<p>Additional Information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cell. Text shown in blue indicate location of instructions in the Technical Guidance Manual - RG-346.</p> <p>Characters shown in red are data entry fields.</p> <p>Characters shown in black [BOLD] are calculated fields. Changes to these fields would change the equations used in the spreadsheet.</p>			
<p>1. The Required Load Reduction for the total project:</p>		<p>Calculations from RG-348 Pages 3-27 to 3-30</p>	
<p>Page 3-29 Equation 3.3. $L_{TSS} = 27.2(A_{UP} \times P)$</p>			
where:	<p>L_{TSS} total project = Required TSS removal resulting from the proposed development = 80% of increased load</p> <p>A_{UP} = Net increase in impervious area for the project</p> <p>P = Average annual precipitation, inches</p>		
<p>Site Data: Determine Required Load Removal based on the Entire Project</p>			
	County =	Boxer	
	Total project area included in plan =	5.09	acres
	Predevelopment impervious area within the limits of the plan =	0.93	acres
	Total post-development impervious area within the limits of the plan =	2.27	acres
	Total post-development impervious cover fraction =	0.45	
	P =	30	inches
	L_{TSS} total project =	1823	lbs.
<p>* The values entered in these fields will be used for the total project area.</p>			
<p>Number of drainage basins / outfalls areas leaving the plan area = 9</p>			
<p>2. Drainage Basin Parameters (This information should be provided for each basin):</p>			
<p>Drainage Basin/Outfall Area No. =</p>		1	
	Total drainage basin/outfall area =	0.40	acres
	Predevelopment impervious area within drainage basin/outfall area =	0.00	acres
	Post-development impervious area within drainage basin/outfall area =	0.01	acres
	Post-development impervious fraction within drainage basin/outfall area =	0.01	
	L_{TSS} this basin =	4	lbs.

Texas Commission on Environmental Quality		Project Name: IRON HORSE TOWNHOMES	
TSS Removal Calculations 04-20-2009		Date Prepared: 7/24/2019	
<p>Additional Information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cell. Text shown in blue indicate location of instructions in the Technical Guidance Manual - RG-348.</p> <p>Characters shown in red are data entry fields.</p> <p>Characters shown in black (Bold) are calculated fields. Changes to these fields will remove the equations used in the spreadsheet.</p>			
1. The Required Load Reduction for the total project		Calculations from RG-348	Pages 3-27 to 3-30
<p>Page 3-29 Equation 3.3: $L_{ij} = 27.2A_{ij} \times P$</p>			
where:	L_{ij} Total project \rightarrow Required TSS removal resulting from the proposed development = 80% of increased load A_{ij} Net increase in impervious area for the project P Average annual precipitation, inches		
<p>Site Data: Determine Required Load Removal from the Entire Project</p>			
	County	Boxar	
	Total project area included in plan =	5.99	acres
	Preadevelopment impervious area within the limits of the plan =	0.03	acres
	Total post-development impervious area within the limits of the plan =	2.27	acres
	Total post-development impervious cover fraction =	0.46	
	P	30	Inches
	L_{ij} Total project \rightarrow	1833	Lbs.
<p>* The values entered in these fields should be for the total project area.</p>			
<p>Number of drainage basins / outfalls areas leaving the plan area = 9</p>			
2. Drainage Basin Parameters (This information should be provided for each basin):			
	Drainage Basin/Outfall Area No. =	7	
	Total drainage basin/outfall area =	0.48	acres
	Preadevelopment impervious area within drainage basin/outfall area =	0.02	acres
	Post-development impervious area within drainage basin/outfall area =	0.01	acres
	Post-development impervious fraction within drainage basin/outfall area =	0.01	
	L_{ij} THIS BASIN \rightarrow	4	Lbs.

Texas Commission on Environmental Quality		Project Name: IRON HORSE TOWNHOMES																			
TSS Remedial Calculations 04-20-2019		Date Prepared: 7/24/2019																			
<p>Additional Information: provided for cells with a red triangle in the upper right corner. Place the cursor over the cell. Text shown in blue indicate location of instructions. See the Technical Guidance Manual - RG-348.</p> <p>Characters shown in red are data entry fields.</p> <p>Characters shown in bold (Bold) are calculated fields. Changes to these fields will remove the equations used in the spreadsheet.</p>																					
1. The Required Load Reduction for the total project:		Calculations from RG 348	Pages 3-27 to 3-30																		
<p>Page 3-29 Equation 3.3: $L_R = 27(A_{N1} \times P)$</p>																					
where:	L_R TOTAL PROJECT = Required TSS removal resulting from the proposed development = 80% of increased load A_{N1} = Net increase in impervious area for the project P = Average annual precipitation, inches																				
<p>Site Data: Determine Required Load Removal from the Entire Project</p> <table border="1"> <thead> <tr> <th>County =</th> <th>Acres</th> </tr> </thead> <tbody> <tr> <td>Total project area included in plan =</td> <td>6.09</td> </tr> <tr> <td>Predevelopment impervious area within the limits of the plan =</td> <td>0.03</td> </tr> <tr> <td>Total post-development impervious area within the limits of the plan =</td> <td>2.37</td> </tr> <tr> <td>Total post-development impervious cover fraction =</td> <td>0.46</td> </tr> <tr> <td></td> <td>30</td> </tr> <tr> <td></td> <td>inches</td> </tr> </tbody> </table>				County =	Acres	Total project area included in plan =	6.09	Predevelopment impervious area within the limits of the plan =	0.03	Total post-development impervious area within the limits of the plan =	2.37	Total post-development impervious cover fraction =	0.46		30		inches				
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	L_R TOTAL PROJECT = 1833 lbs.																				
<p>* The values entered in these fields should be for the total project area.</p>																					
<p>Number of drainage basins / outfalls areas leaving the plan area = 9</p>																					
2. Drainage Basin Parameters (this information should be provided for each basin):																					
Drainage Basin/Outfall Area No. 9																					
<table border="1"> <tbody> <tr> <td>Total drainage basin impervious area =</td> <td>0.86</td> <td>acres</td> </tr> <tr> <td>Predevelopment impervious area within drainage basin impervious area =</td> <td>0.00</td> <td>acres</td> </tr> <tr> <td>Post-development impervious area within drainage basin impervious area =</td> <td>0.08</td> <td>acres</td> </tr> <tr> <td>Post-development impervious fraction within drainage basin impervious area =</td> <td>0.09</td> <td></td> </tr> <tr> <td></td> <td>0.62</td> <td>lbs.</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table>				Total drainage basin impervious area =	0.86	acres	Predevelopment impervious area within drainage basin impervious area =	0.00	acres	Post-development impervious area within drainage basin impervious area =	0.08	acres	Post-development impervious fraction within drainage basin impervious area =	0.09			0.62	lbs.			
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Post-development impervious fraction within drainage basin impervious area =	0.09																				
	0.62	lbs.																			

Cumulative Engineered Solutions Calculations for Texas Commission on Environmental Quality
 TSS Removal Calculations

Project Name: Drainage Treatment																						
Date Required: 7/26/2018																						
1. The Required Load Reduction for the total project:																						
Calculations from RD-348	Page 9 or Equation 3.7: $I_a = 47.5(A_p/A_T)$																					
I_a (TSS/acre) = Required TSS removal resulting from the proposed development + 80% of Increased load I_a = Not increase in impervious area for the project P = Average annual precipitation, inches																						
Site Data: Determine Required Load Reduction based on the Future Project																						
	<table border="1"> <thead> <tr> <th>County</th> <th>Acres</th> </tr> </thead> <tbody> <tr> <td>Total project area included in plan</td> <td>0.00</td> </tr> <tr> <td>Predevelopment impervious area within the limits of the plan</td> <td>0.00</td> </tr> <tr> <td>Total post-development impervious area within the limits of the plan</td> <td>0.00 acres</td> </tr> <tr> <td>Total post-development impervious fraction within drainage basin</td> <td>0.00</td> </tr> <tr> <td>F_i</td> <td>0.00</td> </tr> <tr> <td>I_a (TSS/acre) required</td> <td>429 lbs./acre</td> </tr> </tbody> </table>	County	Acres	Total project area included in plan	0.00	Predevelopment impervious area within the limits of the plan	0.00	Total post-development impervious area within the limits of the plan	0.00 acres	Total post-development impervious fraction within drainage basin	0.00	F_i	0.00	I_a (TSS/acre) required	429 lbs./acre							
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I_a (TSS/acre) required	429 lbs./acre																					
Number of drainage basins / outlets areas having the plus area = 1																						
2. Drainage Basin Parameters (This information should be provided for each basin):																						
	<table border="1"> <thead> <tr> <th>Drainage Basins (Outlets) Area, A_i</th> <th>A_i</th> </tr> </thead> <tbody> <tr> <td>Total drainage basins/outlets area</td> <td>0.00</td> </tr> <tr> <td>Predevelopment impervious area within drainage basins/outlets area</td> <td>0.00 acres</td> </tr> <tr> <td>Post-development impervious area within drainage basins/outlets area</td> <td>0.00 acres</td> </tr> <tr> <td>Post-development impervious fraction within drainage basins/outlets area</td> <td>0.00</td> </tr> <tr> <td>Imperviousness F_i</td> <td>0.00</td> </tr> </tbody> </table>	Drainage Basins (Outlets) Area, A_i	A_i	Total drainage basins/outlets area	0.00	Predevelopment impervious area within drainage basins/outlets area	0.00 acres	Post-development impervious area within drainage basins/outlets area	0.00 acres	Post-development impervious fraction within drainage basins/outlets area	0.00	Imperviousness F_i	0.00									
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Post-development impervious fraction within drainage basins/outlets area	0.00																					
Imperviousness F_i	0.00																					
3. Indicate the proposed BMP code for this basin.																						
	<table border="1"> <thead> <tr> <th>Proposed BMP</th> <th>BF</th> <th>abatement percent</th> </tr> </thead> <tbody> <tr> <td>3F</td> <td>2F</td> <td></td> </tr> </tbody> </table>	Proposed BMP	BF	abatement percent	3F	2F																
Proposed BMP	BF	abatement percent																				
3F	2F																					
4. Calculate Maximum TSS Load Removed (L_R) for this Drainage Basins by the selected BMP Type:																						
RD-348 Page 9 or Equation 3.7: L_R = (BMP effectiveness) $\times F_i \times A_i \times 3.6 \times A_p \times 0.24$																						
A_i = Total area of the drainage area in the BMP treatment area A_i = Impervious area proposed in the BMP treatment area F_i = Percent area resulting in the BMP treatment area L_R = TSS Load removed from this catchment area by the proposed BMP																						
	<table border="1"> <tbody> <tr> <td>A_i</td> <td>0.00</td> </tr> <tr> <td>A_i</td> <td>0.00</td> </tr> <tr> <td>A_i</td> <td>0.00 acres</td> </tr> <tr> <td>F_i</td> <td>0.00</td> </tr> <tr> <td>F_i</td> <td>0.00</td> </tr> </tbody> </table>	A_i	0.00	A_i	0.00	A_i	0.00 acres	F_i	0.00	F_i	0.00											
A_i	0.00																					
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F_i	0.00																					
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5. Calculate Fraction of Annual Runoff to Treat the drainage basins / outlet area																						
	<table border="1"> <tbody> <tr> <td>Desired Load reduction</td> <td>429 lbs.</td> </tr> <tr> <td>F_i</td> <td>0.00</td> </tr> </tbody> </table>	Desired Load reduction	429 lbs.	F_i	0.00																	
Desired Load reduction	429 lbs.																					
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6. Calculate Treated Flow required by the BMP Type for this drainage basins / outlet area.																						
	<table border="1"> <thead> <tr> <th>Off-site areas draining to BMP</th> <th>Off-site impervious cover draining to BMP</th> <th>Off-site area</th> </tr> </thead> <tbody> <tr> <td>A_i</td> <td>0.00</td> <td>0.00 acres</td> </tr> <tr> <td>A_i</td> <td>0.00</td> <td>0.00 acres</td> </tr> <tr> <td>Relative Treatment Volume</td> <td>0.00</td> <td></td> </tr> <tr> <td>Effective area</td> <td>0.00</td> <td>0.00 acres per hour</td> </tr> <tr> <td>Catchment Length</td> <td>0.00</td> <td></td> </tr> <tr> <td>Peak Treatment Flow Required =</td> <td>0.00</td> <td>cubic feet per second</td> </tr> </tbody> </table>	Off-site areas draining to BMP	Off-site impervious cover draining to BMP	Off-site area	A_i	0.00	0.00 acres	A_i	0.00	0.00 acres	Relative Treatment Volume	0.00		Effective area	0.00	0.00 acres per hour	Catchment Length	0.00		Peak Treatment Flow Required =	0.00	cubic feet per second
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Relative Treatment Volume	0.00																					
Effective area	0.00	0.00 acres per hour																				
Catchment Length	0.00																					
Peak Treatment Flow Required =	0.00	cubic feet per second																				
7. July/July Designed as indicated in RD-348 Section 3.6.6																						

Flow Through Drifted Run

July/July Run for Base-Case Configuration: **7/27/2018** cfs
 July/July Treatment Flow Rate = **0.00** cfs

[illegible]

BMP	DRAINAGE AREA	REQUIRED TSS REMOVAL (LBS)	DESIGNED TSS REMOVAL (LBS)
VEGETATED FILTER STRIP #1	A3	238	259
VEGETATED FILTER STRIP #2	A5	127	139
VEGETATED FILTER STRIP #3	A6	65	74
VEGETATED FILTER STRIP #4	A8	85	97
JELLYFISH FILTER #1	A1	452	493
JELLYFISH FILTER #2	A7	308	334
BYPASS #1	A9	4	0
BYPASS #2	A2	4	0
BYPASS #3	A4	62	0
TOTAL TSS		1834	1962

4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

IRONHORSE TOWNHOMES

WATER POLLUTION ABATEMENT PLAN

DATE
8/02/2019

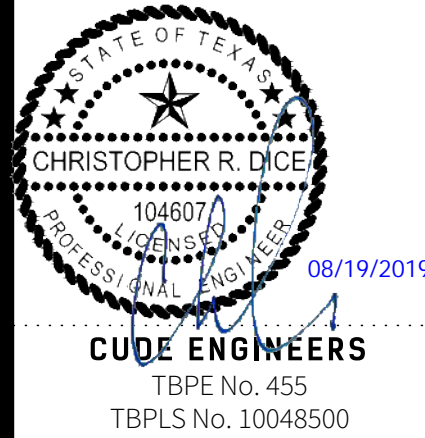
PROJECT NO.
03404.00

DRAWN BY
JC/PL/SG/JC

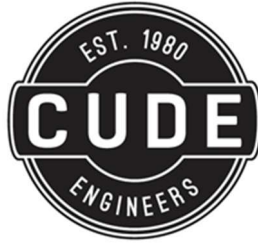
CHECKED BY
JC/DDC

REVISIONS

- 1.
- 2.
- 3.
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- 5.
- 6.
- 7.
- 8.
- 9.



E3



TEMPORARY STORMWATER SECTION

Temporary Stormwater Section

Texas Commission on Environmental Quality

for Regulated Activities on the Edwards Aquifer Recharge Zone and Relating to 30 TAC §213.5(b)(4)(A), (B), (D)(I) and (G); Effective June 1, 1999

To ensure that the application is administratively complete, confirm that all fields in the form are complete, verify that all requested information is provided, consistently reference the same site and contact person in all forms in the application, and ensure forms are signed by the appropriate party.

Note: Including all the information requested in the form and attachments contributes to more streamlined technical reviews.

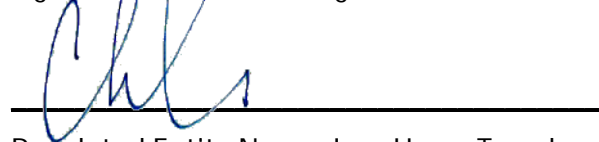
Signature

To the best of my knowledge, the responses to this form accurately reflect all information requested concerning the proposed regulated activities and methods to protect the Edwards Aquifer. This Temporary Stormwater Section is hereby submitted for TCEQ review and executive director approval. The application was prepared by:

Print Name of Customer/Agent: Christopher R. Dice

Date: August 2, 2019

Signature of Customer/Agent:



Regulated Entity Name: Iron Horse Townhomes

Project Information

Potential Sources of Contamination

Examples: Fuel storage and use, chemical storage and use, use of asphaltic products, construction vehicles tracking onto public roads, and existing solid waste.

1. Fuels for construction equipment and hazardous substances which will be used during construction:

☐ The following fuels and/or hazardous substances will be stored on the site: _____

These fuels and/or hazardous substances will be stored in:

- ☐ Aboveground storage tanks with a cumulative storage capacity of less than 250 gallons will be stored on the site for less than one (1) year.

- ☐ Aboveground storage tanks with a cumulative storage capacity between 250 gallons and 499 gallons will be stored on the site for less than one (1) year.
- ☐ Aboveground storage tanks with a cumulative storage capacity of 500 gallons or more will be stored on the site. An Aboveground Storage Tank Facility Plan application must be submitted to the appropriate regional office of the TCEQ prior to moving the tanks onto the project.
- ☒ Fuels and hazardous substances will not be stored on the site.
- 2. ☒ Attachment A - Spill Response Actions. A site specific description of the measures to be taken to contain any spill of hydrocarbons or hazardous substances is attached.
- 3. ☒ Temporary aboveground storage tank systems of 250 gallons or more cumulative storage capacity must be located a minimum horizontal distance of 150 feet from any domestic, industrial, irrigation, or public water supply well, or other sensitive feature.
- 4. ☒ Attachment B - Potential Sources of Contamination. A description of any activities or processes which may be a potential source of contamination affecting surface water quality is attached.

Sequence of Construction

- 5. ☒ Attachment C - Sequence of Major Activities. A description of the sequence of major activities which will disturb soils for major portions of the site (grubbing, excavation, grading, utilities, and infrastructure installation) is attached.
 - ☒ For each activity described, an estimate (in acres) of the total area of the site to be disturbed by each activity is given.
 - ☐ For each activity described, include a description of appropriate temporary control measures and the general timing (or sequence) during the construction process that the measures will be implemented.
- 6. ☒ Name the receiving water(s) at or near the site which will be disturbed or which will receive discharges from disturbed areas of the project: Helotes Creek

Temporary Best Management Practices (TBMPs)

Erosion control examples: tree protection, interceptor swales, level spreaders, outlet stabilization, blankets or matting, mulch, and sod. Sediment control examples: stabilized construction exit, silt fence, filter dikes, rock berms, buffer strips, sediment traps, and sediment basins. Please refer to the Technical Guidance Manual for guidelines and specifications. All structural BMPs must be shown on the site plan.

- 7. ☒ Attachment D – Temporary Best Management Practices and Measures. TBMPs and measures will prevent pollution of surface water, groundwater, and stormwater. The construction-phase BMPs for erosion and sediment controls have been designed to retain sediment on site to the extent practicable. The following information is attached:

- ☒ A description of how BMPs and measures will prevent pollution of surface water, groundwater or stormwater that originates upgradient from the site and flows across the site.
 - ☒ A description of how BMPs and measures will prevent pollution of surface water or groundwater that originates on-site or flows off site, including pollution caused by contaminated stormwater runoff from the site.
 - ☒ A description of how BMPs and measures will prevent pollutants from entering surface streams, sensitive features, or the aquifer.
 - ☒ A description of how, to the maximum extent practicable, BMPs and measures will maintain flow to naturally-occurring sensitive features identified in either the geologic assessment, TCEQ inspections, or during excavation, blasting, or construction.
8. ☒ The temporary sealing of a naturally-occurring sensitive feature which accepts recharge to the Edwards Aquifer as a temporary pollution abatement measure during active construction should be avoided.
- ☐ Attachment E - Request to Temporarily Seal a Feature. A request to temporarily seal a feature is attached. The request includes justification as to why no reasonable and practicable alternative exists for each feature.
 - ☒ There will be no temporary sealing of naturally-occurring sensitive features on the site.
9. ☒ Attachment F - Structural Practices. A description of the structural practices that will be used to divert flows away from exposed soils, to store flows, or to otherwise limit runoff discharge of pollutants from exposed areas of the site is attached. Placement of structural practices in floodplains has been avoided.
10. ☒ Attachment G - Drainage Area Map. A drainage area map supporting the following requirements is attached:
- ☐ For areas that will have more than 10 acres within a common drainage area disturbed at one time, a sediment basin will be provided.
 - ☐ For areas that will have more than 10 acres within a common drainage area disturbed at one time, a smaller sediment basin and/or sediment trap(s) will be used.
 - ☐ For areas that will have more than 10 acres within a common drainage area disturbed at one time, a sediment basin or other equivalent controls are not attainable, but other TBMPs and measures will be used in combination to protect down slope and side slope boundaries of the construction area.
 - ☐ There are no areas greater than 10 acres within a common drainage area that will be disturbed at one time. A smaller sediment basin and/or sediment trap(s) will be used in combination with other erosion and sediment controls within each disturbed drainage area.

- ☒ There are no areas greater than 10 acres within a common drainage area that will be disturbed at one time. Erosion and sediment controls other than sediment basins or sediment traps within each disturbed drainage area will be used.
11. ☐ Attachment H - Temporary Sediment Pond(s) Plans and Calculations. Temporary sediment pond or basin construction plans and design calculations for a proposed temporary BMP or measure have been prepared by or under the direct supervision of a Texas Licensed Professional Engineer. All construction plans and design information must be signed, sealed, and dated by the Texas Licensed Professional Engineer. Construction plans for the proposed temporary BMPs and measures are attached.
- ☒ N/A
12. ☒ Attachment I - Inspection and Maintenance for BMPs. A plan for the inspection of each temporary BMP(s) and measure(s) and for their timely maintenance, repairs, and, if necessary, retrofit is attached. A description of the documentation procedures, recordkeeping practices, and inspection frequency are included in the plan and are specific to the site and/or BMP.
13. ☒ All control measures must be properly selected, installed, and maintained in accordance with the manufacturer's specifications and good engineering practices. If periodic inspections by the applicant or the executive director, or other information indicate a control has been used inappropriately, or incorrectly, the applicant must replace or modify the control for site situations.
14. ☒ If sediment escapes the construction site, off-site accumulations of sediment must be removed at a frequency sufficient to minimize offsite impacts to water quality (e.g., fugitive sediment in street being washed into surface streams or sensitive features by the next rain).
15. ☒ Sediment must be removed from sediment traps or sedimentation ponds not later than when design capacity has been reduced by 50%. A permanent stake will be provided that can indicate when the sediment occupies 50% of the basin volume.
16. ☒ Litter, construction debris, and construction chemicals exposed to stormwater shall be prevented from becoming a pollutant source for stormwater discharges (e.g., screening outfalls, picked up daily).

Soil Stabilization Practices

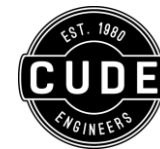
Examples: establishment of temporary vegetation, establishment of permanent vegetation, mulching, geotextiles, sod stabilization, vegetative buffer strips, protection of trees, or preservation of mature vegetation.

17. ☒ Attachment J - Schedule of Interim and Permanent Soil Stabilization Practices. A schedule of the interim and permanent soil stabilization practices for the site is attached.

18. ☒ Records must be kept at the site of the dates when major grading activities occur, the dates when construction activities temporarily or permanently cease on a portion of the site, and the dates when stabilization measures are initiated.
19. ☒ Stabilization practices must be initiated as soon as practicable where construction activities have temporarily or permanently ceased.

Administrative Information

20. ☒ All structural controls will be inspected and maintained according to the submitted and approved operation and maintenance plan for the project.
21. ☒ If any geologic or manmade features, such as caves, faults, sinkholes, etc., are discovered, all regulated activities near the feature will be immediately suspended. The appropriate TCEQ Regional Office shall be immediately notified. Regulated activities must cease and not continue until the TCEQ has reviewed and approved the methods proposed to protect the aquifer from any adverse impacts.
22. ☒ Silt fences, diversion berms, and other temporary erosion and sediment controls will be constructed and maintained as appropriate to prevent pollutants from entering sensitive features discovered during construction.



ATTACHMENT A – SPILL RESPONSE ACTIONS

Spill Prevention and Control

The objective of this section is to describe measures to prevent or reduce the discharge of pollutants to drainage systems or watercourses from leaks and spills by reducing the chance for spills, stopping the source of spills, containing and cleaning up spills, properly disposing of spill materials, and training employees. The following steps will help reduce the storm water impacts of leaks and spills:

Education

- (1) Be aware that different materials pollute in different amounts. Make sure that each employee knows what a “significant spill” is for each material they use, and what is the appropriate response for “significant” and “insignificant” spills. Employees should also be aware of when spill must be reported to the TCEQ. Information available in 30 TAC 327.4 and 40 CFR 302.4.
- (2) Educate employees and subcontractors on potential dangers to humans and the environment from spills and leaks.
- (3) Hold regular meetings to discuss and reinforce appropriate disposal procedures (incorporate into regular safety meetings).
- (4) Establish a continuing education program to indoctrinate new employees.
- (5) Have contractor's superintendent or representative oversee and enforce proper spill prevention and control measures.

General Measures

- (1) To the extent that the work can be accomplished safely, spills of oil, petroleum products, and substances listed under 40 CFR parts 110,117, and 302, and sanitary and septic wastes should be contained and cleaned up immediately.
- (2) Store hazardous materials and wastes in covered containers and protect from vandalism.
- (3) Place a stockpile of spill cleanup materials where it will be readily accessible.
- (4) Train employees in spill prevention and cleanup.
- (5) Designate responsible individuals to oversee and enforce control measures.
- (6) Spills should be covered and protected from stormwater runoff during rainfall to the extent that it doesn't compromise clean-up activities.
- (7) Do not bury or wash spills with water.
- (8) Store and dispose of used clean up materials, contaminated materials, and recovered spill material that is no longer suitable for the intended purpose in conformance with the provisions in applicable BMPs.
- (9) Do not allow water used for cleaning and decontamination to enter storm drains or watercourses. Collect and dispose of contaminated water in accordance with applicable regulations.
- (10) Contain water overflow or minor water spillage and do not allow it to discharge into drainage facilities or watercourses.
- (11) Place Material Safety Data Sheets (MSDS), as well as proper storage, cleanup, and spill reporting instructions for hazardous materials stored or used on the project site in an open, conspicuous, and accessible location.
- (12) Keep waste storage areas clean, well-organized, and equipped with ample cleanup supplies as appropriate for the materials being stored. Perimeter controls, containment structures, covers, and liners should be repaired or replaced as needed to maintain proper function.

Cleanup

- (1) Clean up leaks and spills immediately.
- (2) Use a rag for small spills on paved surfaces, a damp mop for general cleanup, and absorbent material for larger spills. If the spilled material is hazardous, then the used cleanup materials are also hazardous and must be disposed of as hazardous waste.
- (3) Never hose down or bury dry material spills. Clean up as much of the material as possible and dispose of properly. See the waste management BMPs in this section for specific information.

Minor Spills

- (1) Minor spills typically involve small quantities of oil, gasoline, paint, etc. which can be controlled by the first responder at the discovery of the spill.
- (2) Use absorbent materials on small spills rather than hosing down or burying the spill.
- (3) Absorbent materials should be promptly removed and disposed of properly.
- (4) Follow the practice below for a minor spill:
 - a) Contain the spread of the spill.
 - b) Recover spilled materials.
 - c) Clean the contaminated area and properly dispose of contaminated materials.

Semi-significant Spills

Semi-significant spills still can be controlled by the first responder along with the aid of other personnel such as laborers and the foreman, etc. This response may require the cessation of all other activities.

Spills should be cleaned up immediately:

- (1) Contain spread of the spill.
- (2) Notify the project foreman immediately.
- (3) If the spill occurs on paved or impermeable surfaces, clean up using "dry" methods (absorbent materials, cat litter and/or rags). Contain the spill by encircling with absorbent materials and do not let the spill spread widely.
- (4) If the spill occurs in dirt areas, immediately contain the spill by constructing an earthen dike. Dig up and properly dispose of contaminated soil.
- (5) If the spill occurs during rain, cover spill with tarps or other material to prevent contaminating runoff.

Significant/Hazardous Spills

For significant or hazardous spills that are in reportable quantities:

- (1) Notify the TCEQ by telephone as soon as possible and within 24 hours at 512-339-2929 (Austin) or 210-490-3096 (San Antonio) between 8 AM and 5 PM. After hours, contact the Environmental Release Hotline at 1-800-832-8224. It is the contractor's responsibility to have all emergency phone numbers at the construction site.
- (2) For spills of federal reportable quantities, in conformance with the requirements in 40 CFR parts 110, 119, and 302, the contractor should notify the National Response Center at (800) 424-8802.
- (3) Notification should first be made by telephone and followed up with a written report.
- (4) The services of a spills contractor or a Haz-Mat team should be obtained immediately. Construction personnel should not attempt to clean up until the appropriate and qualified staffs have arrived at the job site.
- (5) Other agencies which may need to be consulted include, but are not limited to, the City Police Department, County Sheriff Office, Fire Departments, etc.

More information on spill rules and appropriate responses is available on the TCEQ website at:
<http://www.tceq.texas.gov/response/spills.html>

Vehicle and Equipment Maintenance

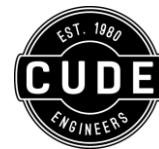
- (1) If maintenance must occur onsite, use a designated area and a secondary containment, located away from drainage courses, to prevent the run-on of stormwater and the runoff of spills.
- (2) Regularly inspect onsite vehicles and equipment for leaks and repair immediately.
- (3) Check incoming vehicles and equipment (including delivery trucks, and employee and subcontractor vehicles) for leaking oil and fluids. Do not allow leaking vehicles or equipment onsite.
- (4) Always use secondary containment, such as a drain pan or drop cloth, to catch spills or leaks when removing or changing fluids.
- (5) Place drip pans or absorbent materials under paving equipment when not in use.
- (6) Use absorbent materials on small spills rather than hosing down or burying the spill. Remove the absorbent materials promptly and dispose of properly.
- (7) Promptly transfer used fluids to the proper waste or recycling drums. Don't leave fill drip pans or other open containers lying around.
- (8) Oil filters disposed of in trashcans or dumpsters can leak and pollute stormwater. Place the oil filter in a funnel over a waste oil-recycling drum to drain excess oil before disposal. Oil filters can also be recycled. Ask the oil supplier or recycler about recycling oil filters.
- (9) Store cracked batteries in a non-leaking secondary container. Do this with all cracked batteries even if you & think all the acid has drained out. If you drop a battery, treat it as if it is cracked. Put it into the containment area until you are sure it is not leaking.

Vehicle and Equipment Fueling

- (1) If fueling must occur on site, use designated areas, located away from drainage courses, to prevent the runoff of stormwater and the runoff of spills.
- (2) Discourage "topping off" of fuel tanks.
- (3) Always use secondary containment, such as a drain pan, when fueling to catch spills/leaks.

Spill Response Actions

In the event that a spill of hydrocarbons or hazardous substances does occur, the contractor shall be required to maintain a sufficient stockpile of sand material in the staging area. This sand material shall be used to immediately isolate and provide containment of the spill by constructing dikes. Furthermore, this sand material shall act as an absorbent material that can be disposed of offsite and out of the Recharge Zone during clean-up operations. The contractor, in the event of a spill, shall also notify the owner who shall contact TCEQ. All contaminated soils resulting from an accidental release will be required to be removed and disposed of in accordance with all local, state and federal regulations.



ATTACHMENT B – POTENTIAL SOURCES OF CONTAMINATION

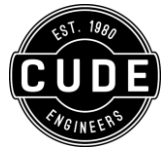
Potential Source	Oil, grease, fuel and hydraulic fluid contamination from construction equipment and vehicle dripping.
Preventive Measure	Vehicle maintenance, when possible, will be performed within a construction staging area specified by the General Contractor.
Potential Source	Miscellaneous trash and litter from construction workers and material wrappings.
Preventive Measure	Trash containers will be placed throughout the site to encourage proper trash disposal.
Potential Source	Construction debris.
Preventive Measure	Construction debris will be monitored daily by contractor. Debris will be collected weekly and placed in disposal bins. Situations requiring immediate attention will be addressed on a case by case basis.
Potential Source	Stormwater contamination from excess application of fertilizers, herbicides and pesticides.
Preventive Measure	Fertilizers, herbicides and pesticides will be applied only when necessary and in accordance with manufacturers' directions.
Potential Source	Soil and mud from construction vehicle tires as they leave the site.
Preventive Measure	A temporary construction entrance/exit shall be utilized as vehicles leave the site. Any soil, mud, etc. carried from the project onto public roads shall be cleaned up within 24 hours.
Potential Source	Sediment from soil, sand, gravel and excavated materials stockpiled on site.
Preventive Measure	Silt fence shall be installed on the down gradient side of all stockpiled materials. Reinforced rock berms shall be installed at all downstream discharge locations.
Potential Source	Portable toilet spill
Preventive Measure	Toilets on the site will be emptied on a regular basis by the contracted toilet company.



ATTACHMENT C – SEQUENCE OF MAJOR ACTIVITIES

SEQUENCE ITEMS	DESCRIPTION	APPROXIMATE ACRES DISTURBED
1	SITE CLEARING FOR INFRASTRUCTURE IMPROVEMENTS	5.09
2	SITE GRADING FOR INFRASTRUCTURE IMPROVEMENTS	5.09
3	CONSTRUCTION OF SEWER AND WATER LINES	0.90
4	INSTALLATION OF PARKING LOT AREAS, STREETS, & SIDEWALKS	0.59
5	LOT GRADING & BUILDING CONSTRUCTION – FINAL SITE CLEARING	2.43
6	LOT GRADING & BUILDING CONSTRUCTION – FINAL SITE GRADING	2.43

Temporary control measures used for each major activity listed above should include construction entrances/exits, concrete washout areas, silt fences, rock berms, bagged gravel inlet filters, and temporary seeding. More information on these temporary best management practices can be found on the next page. (Attachment D)



ATTACHMENT D – TEMPORARY BEST MANAGEMENT PRACTICES AND MEASURES

The TBMPs and measures utilized for the proposed project to prevent pollution of storm water, groundwater, and surface water during the construction phase are the following:

1. Temporary Construction Entrance/Exit – A stabilized pad of crushed stone located at any point where traffic will be entering or leaving the construction site from a public R.O.W., street, alley, sidewalk or parking area. It shall be a minimum of 50 feet long, 12 feet wide and 8 inches thick. The rock shall be 4 to 8 inches in size.
2. Concrete Washout Areas- A pit containment area with a 10 mil plastic lining with a berm and sand bags to prevent or reduce the discharge of pollutants from concrete waste shall be constructed in an area readily accessible to construction traffic and at least 50 ft. away from any sensitive features, storm drains, open ditches or water bodies.
3. Silt Fence – A barrier consisting of geotextile fabric supported by metal posts to prevent soil and sediment loss from a site. Silt fences shall be installed on the down gradient side of the proposed areas to be disturbed that have a drainage area of 2 or less acres.
4. Rock Berms – A structure of 3 to 5 inch diameter rock secured with a woven wire sheath to serve as a check dam in areas of concentrated flow, to intercept sediment-laden runoff, detain the sediment and release the water in sheet flow.
5. Bagged Gravel Inlet Filter – Sandbags filled with washed pea gravel and stacked to form a continuous barrier about 1 foot high around the inlets.
6. Temporary Seeding – Temporary seeding of disturbed areas shall be performed if disturbed areas are expected to have no construction activity for a period of at least 21 days

Sequence of installation during construction process

1. The Temporary Construction Entrance/Exit shall be installed prior to disturbing any soil except at the location of the Temporary Construction Entrance/Exit. It shall stay in place and be maintained until the end of the infrastructure construction.
2. Silt Fence will be installed along the down gradient side of the proposed site prior to disturbing any soil. It shall stay in place and be maintained until the site has been properly re-vegetated.
3. Rock Berms – Rock berms shall be installed around the perimeter of the project at natural low points following rough grading of the site and shall be removed once grading to the on-site stormwater drainage system with bagged gravel inlet filters in sump is complete. Rock berms will also be utilized at the outlet of the pond while it is being constructed.
4. Concrete washout pits shall be installed prior to any concrete work to be done on site. It shall remain on site until all concrete work has been completed and hardened concrete shall be broken up, removed and disposed of properly. Materials for the pit shall be removed from the site and also be disposed of properly. Any depressions or ground disturbance due to removal of pit area shall be backfilled and repaired.
5. Bagged Gravel Inlet Filters shall be placed around all inlets following installation.

6. Temporary Seeding shall be installed in areas which are considered as final grades and area will not be covered by pavements, building or other structures. Seeding shall also be done in graded areas where there is a potential for erosion on steep slopes.

Upgradient Surface water, Groundwater and Stormwater

There is no surface water or ground water originating from the site. There is approximately 1.74 acres of up-gradient stormwater that will drain to the site.

Onsite Surface water, Groundwater and Stormwater

Temporary BMPs utilized on the proposed project site to prevent pollution of onsite surface water, groundwater, and storm water are the silt fences acting as barriers to prevent pollution of stormwater. Permanent BMP's will treat stormwater that originates onsite in areas that will remain impervious.

Prevention of Pollutants Entering Surface Streams, Sensitive Features and the Aquifer

Temporary BMPs utilized on the proposed project site to prevent pollution of surface streams, sensitive features, and the aquifer are temporary construction entrance/exit, silt fences, and rock berms. The construction entrance/exit provides a stable exit from the construction site and keeps sediment and mud off public roads. The other TBMPs delineated act in like manner as previously described to protect surface streams, sensitive features, and the aquifer.



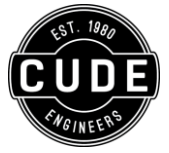
ATTACHMENT E – REQUEST TO TEMPORARILY SEAL A FEATURE

Not applicable to this project

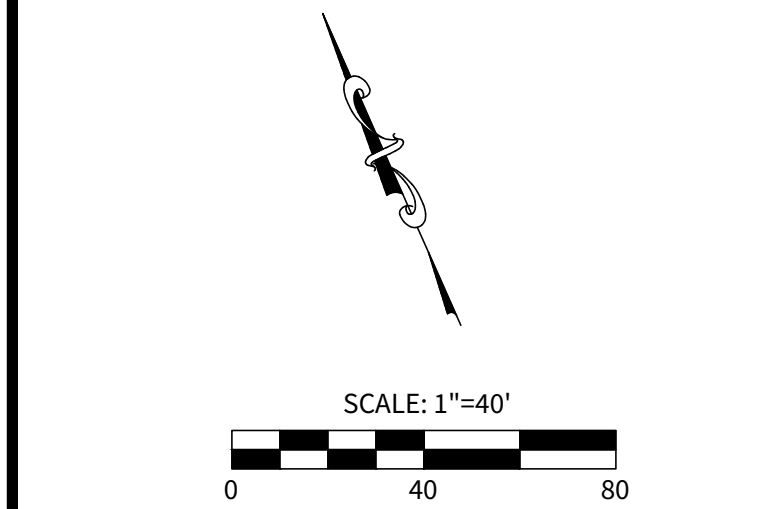


ATTACHMENT F – STRUCTURAL PRACTICES

Runoff discharge of pollutants from exposed areas of the site will be limited through the utilization of temporary BMPs. Prior to leaving the site, flows containing pollutant discharges will be treated by a silt fence, bagged gravel inlet filters, or rock berms which will limit the amount of pollutants leaving the site. These temporary BMPs will be placed in the natural lows that discharge from the site. They will be placed in flows low enough to keep the temporary BMP intact throughout construction.



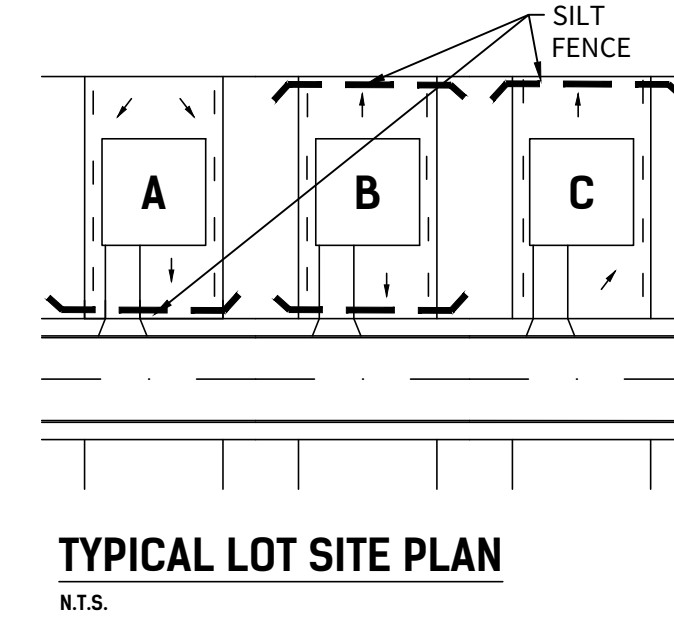
ATTACHMENT G – DRAINAGE AREA MAP



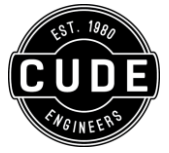
1. SOIL DISTURBANCES WILL OCCUR OVER THE SITE UNLESS INDICATED OTHERWISE AS A "AREA OF UNDISTURBED SOIL."
2. LOCATIONS OF MAJOR STRUCTURAL AND NONSTRUCTURAL CONTROLS ARE LABELED. THESE ARE THE TEMPORARY AND PERMANENT BEST MANAGEMENT PRACTICES (B.M.P.'S).
3. SOIL STABILIZATION PRACTICES SHALL OCCUR OVER ALL DISTURBED AREAS WITH THE USE OF PAVEMENT, SIDEWALKS, GRASS SOIL AND GRASS SEEDING.
4. THERE ARE NO LOCATIONS WHERE STORMWATER DISCHARGES DIRECTLY TO SURFACE WATER.
5. ALL STORMWATER DISCHARGING TO SENSITIVE FEATURES SHALL BE COVERED WITH GRASS SOIL.
6. EACH LOT WILL BE RESPONSIBLE FOR ITS OWN TEMPORARY BMP.
7. CONSTRUCTION ENTRANCE/EXIT, WASHOUT PITS, AND STAGING AREAS MUST BE PLACED AT THE LOCATION WHERE THE PROJECT SITE IS BEING ACCESSED FOR CONSTRUCTION DURING VARIOUS PHASES.

EXISTING CONTOUR
 PROPOSED CONTOUR
 DRAINAGE BOUNDARY
 T_C LINE
 ACCUMULATION POINT

— 900 —
 — 1274 —
 —————
 ————
 (X)

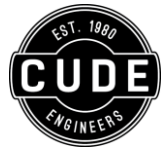


Drainage Shed	Shed Area (Ac.)	AREA OF ACCUMULATION (Ac.)	C	Length x 300'	Paved (Y or N)	Upstream Elev.	Downstream Elev	Slope	Time of Concentration	Length x 650'	Paved (Y or N)	Downstream Elev	Slope	Time of Concentration	Length	Velocity (fps)	Time of Concentration	Time of Concentration (min)	5	125	1100	Q5	Q25	Q100	Drainage Shed
A1	0.66	=A1	0.72	297.92	N	1084.23	1062.86	7.17%	15.74									15.74	5.15	7.13	8.88	2.45	3.39	4.22	A1
A2	0.90	=A2	0.72	300.00	N	1083.78	1058.68	8.37%	15.00	26.65	N	1058.00	2.54%	0.17	140.21	6	0.39	15.56	5.18	7.18	8.93	3.36	4.65	5.79	A2
A3	1.26	=A3	0.72	175.92	N	1060.94	1046.00	8.49%	12.00									12.00	5.86	8.19	10.24	5.32	7.43	9.29	A3
A4	1.74	=A4	0.72	300.00	N	1085.03	1055.28	9.92%	15.00	114.14	N	1044.99	9.02%	0.39	224.07	6	0.62	16.01	5.10	7.06	8.79	6.39	8.84	11.01	A4
A5	1.94	=A5	0.72	300.00	N	1087.00	1062.72	8.09%	15.00						218.02	6	0.61	15.61	5.17	7.16	8.92	7.22	10.00	12.46	A5



ATTACHMENT H – TEMPORARY SEDIMENT POND PLANS AND CALCULATIONS

Not applicable to this project



ATTACHMENT I – INSPECTION AND MAINTENANCE FOR BMPS

Temporary Sediment Control Fences

1. Inspect all fencing weekly, and after any rainfall.
2. Remove sediment when buildup reaches 6 inches.
3. Replace any torn fabric or install a second line of fencing parallel to the torn section.
4. Replace or repair any sections crushed or collapsed in the course of construction activity. If a section of fence is obstructing vehicular access, consider relocating it to a spot where it will provide equal protection, but will not obstruct vehicles. A triangular filter dike may be preferable to a silt fence at common vehicle access points.
5. When construction is complete, the sediment should be disposed of in a manner that will not cause additional siltation and the prior location of silt fence should be re-vegetated. The fence itself should be disposed of in an approved landfill.

Rock Berm / High Service Rock Berm

1. Inspections should be made weekly and after each rainfall by the responsible party.
2. Remove sediment and other debris when buildup reaches 6 inches and dispose of the accumulated silt of in an approved manner.
3. Repair any loose wire sheathing.
4. The berm should be reshaped as needed during inspection.
5. The berm should be replaced when the structure ceases to function as intended due to silt accumulation among the rocks, washout, construction traffic damage, etc.
6. The rock berm should be left in place until all upstream areas are stabilized and accumulated silt removed.

Temporary Construction Entrance and Exits

1. The entrance should be maintained in a condition, which will prevent tracking or following of sediment onto public rights-of-way. This may require periodic top dressing with additional stone as conditions demand and repair and/or cleanout of any measures used to trap sediment.
2. All sediment spilled, dropped, washed or tracked on to public rights-of-ways should be removed immediately by contractor.
3. When necessary, wheels should be cleaned to remove sediment prior to entrance onto public right-of-way.
4. When washing is required, it should be done on an area stabilized with crushed stone that drains into an approved sediment trap or sediment basin.
5. All sediment should be prevented from entering ant storm drain, ditch, or water course by using approved methods.

Bagged Gravel Inlet Filters

1. Inspections should be made weekly and after each rainfall. Repair or replacement should be made promptly as needed by the contractor.
2. Remove sediment when buildup reaches a depth of 3 inches. Removed sediment should be deposited in a suitable area and in such a manner that it will not erode.

3. Check placement of device to prevent gaps between device and curb.
4. Inspect filter fabric and patch or replace if missing or torn,
5. Structures should be removed and the area stabilized only after the remaining drainage area has been properly stabilized.

Temporary Seeding

1. Temporary vegetation should be inspected weekly and after each rain event to locate and repair any erosion.
2. Erosion from storms or other damage should be repaired as soon as practical by regarding the area and applying new seed.
3. If the vegetated cover is less than 80%, the area should be reseeded.

Concrete Washout Pit Area

1. Each material making up pit area shall be inspected for any damage.
2. Plastic lining shall be inspected periodically to ensure no holes, tears or other defects are observed that might compromise the impermeability of the material.
3. Remove accumulated hardened concrete by breaking up and disposing of properly and if necessary, replacing plastic lining.

Documentation Procedures

1. A copy of the inspection report is located on the following page.
2. The inspection report must be maintained on site at all times.
3. The inspection report is incorporated as part of the WPAP. The contractor is responsible for completing and updating the form in compliance with TCEQ rules.

Inspections

Designated and qualified person(s) shall inspect Pollution Control Measures every fourteen days and within 24 hours after a storm event greater than 0.5 inches of rainfall. An inspection report that summarizes the scope of the inspection, names and qualifications of personnel conducting the inspection, date of the inspection, major observations, and actions taken as a result of the inspection shall be recorded and maintained as part of Storm Water TPDES data for a period of three years after the date of the inspection. A copy of the Inspection Report Form is provided in this Storm Water Pollution Prevention Plan.

As a minimum, the inspector shall observe: (1) significant disturbed areas for evidence of erosion, (2) storage areas for evidence of leakage from the exposed stored materials, (3) structural controls (rock berm outlets, silt fences, drainage swales, etc.) for evidence of failure or excess siltation (over 6 inches deep), (4) vehicle exit point for evidence of off-site sediment tracking, (5) vehicle storage areas for signs of leaking equipment or spills, and (6) concrete truck rinse-out pit for signs of potential failure. Deficiencies noted during the inspection will be corrected and documented within seven (7) calendar days following the inspection or before the next anticipated storm event if practicable.

BMP INSPECTION REPORT

Pollution Prevention Measure		Inspected	Corrective Action	
			Description	Date Completed
Silt Fence	Inspections			
	Fencing			
	Sediment Removal			
	Torn Fabric			
	Crushed/Collapsed Fencing			
Construction Entrance/Exit	Inspections			
	Additional top Dressing			
	Repair/Cleanout			
	Sediment removed immediately			
Rock Berm	Inspections			
	Fencing			
	Sediment Removal			
	Torn Fabric			
	Crushed/Collapsed Fencing			
Bagged Gravel Inlet Filter	Inspections			
	Sediment Removal			
	Device Placement			
	Torn Fabric			
Temporary Seeding	Inspections			
	Eroded Areas			
	Vegetated cover less than 80%			
Concrete Washout Pit	Inspections			
	Plastic Lining			
	Berm / sand bags			
	Accumulated concrete/removal			

*Indicate N/A where measure does not apply.

By my signature below, I certify that all items are acceptable and the project site is in compliance with SWPPP.

Inspector's Name

Inspector's Signature

Name of Owner/Operator (Firm)

Date

Note: Inspector is to attach a brief statement of his qualifications to this report.

BMP INSPECTION REPORT

Pollution Prevention Measure	Inspected	Corrective Action	
		Description	Date Completed
General			
Revegetation			
Erosion/Sediment Controls			
Vehicle Exits			
Material Areas			
Equipment Areas			
Concrete Rinse			
Construction Debris			
Trash Receptacles			
Infrastructure			
Roadway Clearing			
Utility Clearing			
Roadway Grading			
Utility Construction			
Drainage Construction			
Roadway Base			
Roadway Surfaces			
Site Cleanups			
Building			
Clearing for Building			
Foundation Grading			
Utility Construction			
Foundation Construction			
Building Construction			
Site Grading			
Site Cleanup			

*Indicate N/A where measure does not apply.

By my signature below, I certify that all items are acceptable and the project site is in compliance with SWPPP.

Inspector's Name

Inspector's Signature

Name of Owner/Operator (Firm)

Date

Note: Inspector is to attach a brief statement of his qualifications to this report.

BMP INSPECTION REPORT PROJECT CONSTRUCTION ACTIVITY MILESTONE DATES

Date when major site grading activities begin:

Construction Activity

Date

Dates when construction activities temporarily or permanently cease on all or a portion of the project:

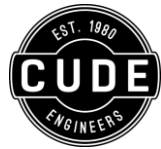
Construction Activity

Date

Date when stabilization measures are initiated:

Stabilization Activity

Date



ATTACHMENT J – SCHEDULE OF INTERIM AND PERMANENT SOIL STABILIZATION PRACTICES

1. Stabilization measures shall be initiated as soon as practicable in portions of the site where construction activities have temporarily or permanently ceased, but in no case more than 14 days after the construction activity in that portion of the site has temporarily or permanently ceased. Where the initiation of stabilization measures by the 14th day after construction activity temporarily or permanently cease is precluded by weather conditions, stabilization measures shall be initiated as soon as practicable. Where construction activity on a portion of the site is temporarily ceased, and earth disturbing activities will be resumed within 21 days, temporary stabilization measures do not have to be initiated on that portion of site. In areas experiencing droughts where the initiation of stabilization measures by the 14th day after construction activity has temporarily or permanently ceased is precluded by seasonal arid conditions, stabilization measures shall be initiated as soon as practicable.
2. Permanent seeding of individually disturbed areas shall be performed when infrastructure construction has been completed.
3. Permanent sodding and mulching of landscape areas shall occur at or near the completion of the project.
4. During construction, contractors shall, to the maximum extent possible, limit their construction activities to areas of construction as noted on the plans in an attempt to preserve as much natural vegetation as possible.

Seeding & Mulching Specifications

1. All seed must meet requirements of the Texas Seed Law including the labeling requirements. These labels shall show purity, germination, name and type of seed. Seed furnished shall be of the previous season's crop for the date of the project, and the date of analysis shown on each bag shall be within nine (9) months of the time of use on the project. Bermuda grass shall be hulled and treated and have a purity of 95% and germination of no less than 90%. Each variety of seed shall be furnished and delivered in separate bags or containers. A sample of each variety of seed shall be furnished for analysis and testing when directed by the Owner.

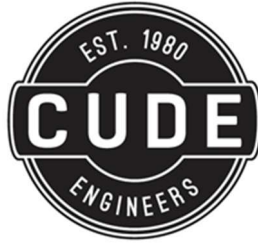
2. Annual Rye grass will be free of Johnson grass, field bindweed, dodder seed, and free of other seed to the limits allowable under the Federal Seed Act and applicable Texas Seed Law. Annual Rye grass will be added into slurry between October 1 through March 15.

3. Wood Cellulose Fiber Mulch. Wood cellulose fiber mulch shall be natural cellulose fiber mulch produced from grinding clean, whole wood chips, or fiber produced from ground newsprint with a labeled ash content not to exceed 7%. The mulch shall be designed for use in conventional mechanical planting, hydraulic planting of seed or hydraulic mulching of grass seed, either alone or with fertilizer and other additives. The mulch shall be that when applied, the material shall form a strong, moisture-

retaining mat without the need of an asphalt binder. The mulch material will also be dyed with a green color to assist in determining coverage and to provide an immediate pleasing appearance. The wood cellulose fiber is also required to be dispersed rapidly in water to form homogeneous slurry and remain in such state when agitated in the hydraulic mulching unit with specified materials.

4. Straw Mulch or Hay Mulch. Straw mulch shall be oat, wheat, or rice straw. Hay mulch shall be prairie grass, Bermuda grass or other hay as approved by the Owner. The straw mulch or hay mulch shall be free of Johnson grass or other noxious weeds and foreign materials. It shall be kept in a dry condition and shall not be molded or rotted.

Optimum Planting Dates	Common Names	Rate, lbs./acre
February 1 – May 1	Bermuda Grass	1.5
September 1 – November 30	Tall Fescue	4.0
	Oats	21.0*
	Wheat (Red, Winter)	30.0
September 1 – November 30	Hairy Vetch	8.0
May 1 – August 31	Foxtail Millet	30.0



PERMANENT STORMWATER SECTION

Permanent Stormwater Section

Texas Commission on Environmental Quality

for Regulated Activities on the Edwards Aquifer Recharge Zone and Relating to 30 TAC §213.5(b)(4)(C), (D)(li), (E), and (5), Effective June 1, 1999

To ensure that the application is administratively complete, confirm that all fields in the form are complete, verify that all requested information is provided, consistently reference the same site and contact person in all forms in the application, and ensure forms are signed by the appropriate party.

Note: Including all the information requested in the form and attachments contributes to more streamlined technical reviews.

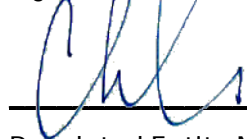
Signature

To the best of my knowledge, the responses to this form accurately reflect all information requested concerning the proposed regulated activities and methods to protect the Edwards Aquifer. This Permanent Stormwater Section is hereby submitted for TCEQ review and executive director approval. The application was prepared by:

Print Name of Customer/Agent: Christopher R. Dice

Date: August 2, 2019

Signature of Customer/Agent



Regulated Entity Name: Iron Horse Townhomes

Permanent Best Management Practices (BMPs)

Permanent best management practices and measures that will be used during and after construction is completed.

1. ☒ Permanent BMPs and measures must be implemented to control the discharge of pollution from regulated activities after the completion of construction.
☐ N/A
2. ☒ These practices and measures have been designed, and will be constructed, operated, and maintained to insure that 80% of the incremental increase in the annual mass loading of total suspended solids (TSS) from the site caused by the regulated activity is removed. These quantities have been calculated in accordance with technical guidance prepared or accepted by the executive director.
☒ The TCEQ Technical Guidance Manual (TGM) was used to design permanent BMPs and measures for this site.

- ☐ A technical guidance other than the TCEQ TGM was used to design permanent BMPs and measures for this site. The complete citation for the technical guidance that was used is: _____
- ☐ N/A
3. ☒ Owners must insure that permanent BMPs and measures are constructed and function as designed. A Texas Licensed Professional Engineer must certify in writing that the permanent BMPs or measures were constructed as designed. The certification letter must be submitted to the appropriate regional office within 30 days of site completion.
- ☐ N/A
4. Where a site is used for low density single-family residential development and has 20 % or less impervious cover, other permanent BMPs are not required. This exemption from permanent BMPs must be recorded in the county deed records, with a notice that if the percent impervious cover increases above 20% or land use changes, the exemption for the whole site as described in the property boundaries required by 30 TAC §213.4(g) (relating to Application Processing and Approval), may no longer apply and the property owner must notify the appropriate regional office of these changes.
- ☐ The site will be used for low density single-family residential development and has 20% or less impervious cover.
- ☐ The site will be used for low density single-family residential development but has more than 20% impervious cover.
- ☒ The site will not be used for low density single-family residential development.
5. The executive director may waive the requirement for other permanent BMPs for multi-family residential developments, schools, or small business sites where 20% or less impervious cover is used at the site. This exemption from permanent BMPs must be recorded in the county deed records, with a notice that if the percent impervious cover increases above 20% or land use changes, the exemption for the whole site as described in the property boundaries required by 30 TAC §213.4(g) (relating to Application Processing and Approval), may no longer apply and the property owner must notify the appropriate regional office of these changes.
- ☐ Attachment A - 20% or Less Impervious Cover Waiver. The site will be used for multi-family residential developments, schools, or small business sites and has 20% or less impervious cover. A request to waive the requirements for other permanent BMPs and measures is attached.
- ☐ The site will be used for multi-family residential developments, schools, or small business sites but has more than 20% impervious cover.
- ☒ The site will not be used for multi-family residential developments, schools, or small business sites.
6. ☒ Attachment B - BMPs for Upgradient Stormwater.

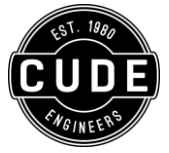
- ☒ A description of the BMPs and measures that will be used to prevent pollution of surface water, groundwater, or stormwater that originates upgradient from the site and flows across the site is attached.
 - ☐ No surface water, groundwater or stormwater originates upgradient from the site and flows across the site, and an explanation is attached.
 - ☐ Permanent BMPs or measures are not required to prevent pollution of surface water, groundwater, or stormwater that originates upgradient from the site and flows across the site, and an explanation is attached.
7. ☒ Attachment C - BMPs for On-site Stormwater.
- ☒ A description of the BMPs and measures that will be used to prevent pollution of surface water or groundwater that originates on-site or flows off the site, including pollution caused by contaminated stormwater runoff from the site is attached.
 - ☐ Permanent BMPs or measures are not required to prevent pollution of surface water or groundwater that originates on-site or flows off the site, including pollution caused by contaminated stormwater runoff, and an explanation is attached.
8. ☐ Attachment D - BMPs for Surface Streams. A description of the BMPs and measures that prevent pollutants from entering surface streams, sensitive features, or the aquifer is attached. Each feature identified in the Geologic Assessment as sensitive has been addressed.
- ☒ N/A
9. ☒ The applicant understands that to the extent practicable, BMPs and measures must maintain flow to naturally occurring sensitive features identified in either the geologic assessment, executive director review, or during excavation, blasting, or construction.
- ☒ The permanent sealing of or diversion of flow from a naturally-occurring sensitive feature that accepts recharge to the Edwards Aquifer as a permanent pollution abatement measure has not been proposed.
 - ☐ Attachment E - Request to Seal Features. A request to seal a naturally-occurring sensitive feature, that includes, for each feature, a justification as to why no reasonable and practicable alternative exists, is attached.
10. ☒ Attachment F - Construction Plans. All construction plans and design calculations for the proposed permanent BMP(s) and measures have been prepared by or under the direct supervision of a Texas Licensed Professional Engineer, and are signed, sealed, and dated. The plans are attached and, if applicable include:
- ☒ Design calculations (TSS removal calculations)
 - ☒ TCEQ construction notes
 - ☒ All geologic features
 - ☒ All proposed structural BMP(s) plans and specifications
- ☐ N/A

11. ☐ Attachment G - Inspection, Maintenance, Repair and Retrofit Plan. A plan for the inspection, maintenance, repairs, and, if necessary, retrofit of the permanent BMPs and measures is attached. The plan includes all of the following:
- ☐ Prepared and certified by the engineer designing the permanent BMPs and measures
 - ☐ Signed by the owner or responsible party
 - ☐ Procedures for documenting inspections, maintenance, repairs, and, if necessary retrofit
 - ☐ A discussion of record keeping procedures
- ☒ N/A
12. ☐ Attachment H - Pilot-Scale Field Testing Plan. Pilot studies for BMPs that are not recognized by the Executive Director require prior approval from the TCEQ. A plan for pilot-scale field testing is attached.
- ☒ N/A
13. ☐ Attachment I - Measures for Minimizing Surface Stream Contamination. A description of the measures that will be used to avoid or minimize surface stream contamination and changes in the way in which water enters a stream as a result of the construction and development is attached. The measures address increased stream flashing, the creation of stronger flows and in-stream velocities, and other in-stream effects caused by the regulated activity, which increase erosion that results in water quality degradation.
- ☒ N/A

Responsibility for Maintenance of Permanent BMP(s)

Responsibility for maintenance of best management practices and measures after construction is complete.

14. ☒ The applicant is responsible for maintaining the permanent BMPs after construction until such time as the maintenance obligation is either assumed in writing by another entity having ownership or control of the property (such as without limitation, an owner's association, a new property owner or lessee, a district, or municipality) or the ownership of the property is transferred to the entity. Such entity shall then be responsible for maintenance until another entity assumes such obligations in writing or ownership is transferred.
- ☐ N/A
15. ☒ A copy of the transfer of responsibility must be filed with the executive director at the appropriate regional office within 30 days of the transfer if the site is for use as a multiple single-family residential development, a multi-family residential development, or a non-residential development such as commercial, industrial, institutional, schools, and other sites where regulated activities occur.
- ☐ N/A



ATTACHMENT A – 20% OR LESS IMPERVIOUS COVER DECLARATION

Not Applicable to this project



ATTACHMENT B – BMPS FOR UPGRADIENT STORMWATER

Approximately 1.40 acres of offsite drainage area contribute to the total run-off of the drainage shed. The upgradient stormwater comes from the back of existing large residential lots. The offsite area is mostly developed as average lot residential areas to the north of our site. This upgradient stormwater will flow into the proposed jellyfish filter cub inlet to be treated. All other offsite drainage areas will bypass the proposed jellyfish filter or be treated through engineered vegetative filter strips. The proposed subdivision does not include permanent BMP's or measures to prevent pollution of surface water, groundwater, or stormwater that originates up gradient from this site or flows across this site per regulations provided by the Texas Commission on Environmental Quality.

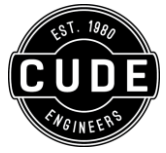


ATTACHMENT C – BMPS FOR ONSITE STORMWATER

Permanent BMPs proposed for pollution abatement of the subdivision campus comprises of the following:

- 4 Areas of Vegetated Filter Strip (Engineered)
- 2 Jellyfish Filter Tank

The four filter strip areas will treat the runoff from individual residential lots that drain towards the rear. The proposed best management practices (BMPs) will treat at least 80% of the increase in total suspended solids (TSS) for the site. The Jellyfish Filter Tank has been designed to serve as a permanent BMP.



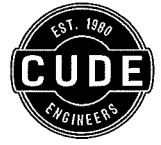
ATTACHMENT D – BMPS FOR SURFACE STREAMS

There are no surface streams within the limits or vicinity of the site and thus no additional temporary or permanent BMPs are proposed to protect surface streams.



ATTACHMENT E – CONSTRUCTION PLANS

The construction plans and design calculations for the proposed permanent BMPs and measures for the proposed project to have been prepared by or under the direct supervision of a Texas Licensed Profession Engineer. The design calculations, TCEQ Construction Notes, all man-made or naturally occurring geologic features, all proposed structural measures, and appropriate details are shown on the construction plans.



ATTACHMENT F – INSPECTIONS, MAINTENANCE, REPAIR AND RETROFIT PLAN

PERMANENT POLLUTION ABATEMENT MEASURES MAINTENANCE SCHEDULE AND MAINTENANCE PROCEDURES

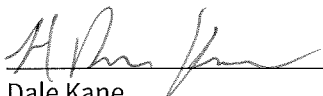
This document has been prepared to provide a description and schedule for the performance of maintenance of permanent pollution abatement measures. Maintenance measures to be performed will be dependent on what permanent pollution abatement measures are incorporated into the project. The project specific water pollution abatement plan should be reviewed to determine what permanent pollution abatement measures are incorporated into a project.

It should also be noted that the timing and procedures presented herein are general guidelines, adjustment to the timing and procedures may have to be made depending on project specific characteristics as well as weather related conditions. Any changes to the inspection and/or maintenance of permanent BMP's are required to be certified by the project engineer, as well as being submitted to and approved by the TCEQ.

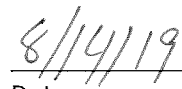
Where a project is occupied by the owner, the owner may provide for maintenance with his own skilled forces or contract for recommended maintenance of Permanent Best Management Practices. Where a project is occupied or leased by a tenant, the owner shall require tenants to contract for such maintenance services either through a lease agreement, property owner's association covenants, or other binding document.

I understand that I am responsible for maintenance of the Permanent Pollution Abatement Measures included in this project until such time as the maintenance obligation is either assumed in writing by another entity having ownership or control of the property or ownership is transferred.

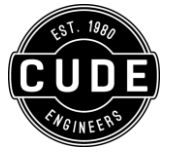
I, the owner, have read and understand the requirements of the attached Maintenance Plan and Schedule.



Dale Kane
Kherington Hadley



Date



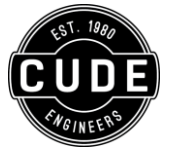
ATTACHMENT G – PILOT SCALE FIELD TESTING PLAN

Not Applicable to this project



ATTACHMENT H – MEASURES FOR MINIMIZING SURFACE STREAM CONTAMINATION

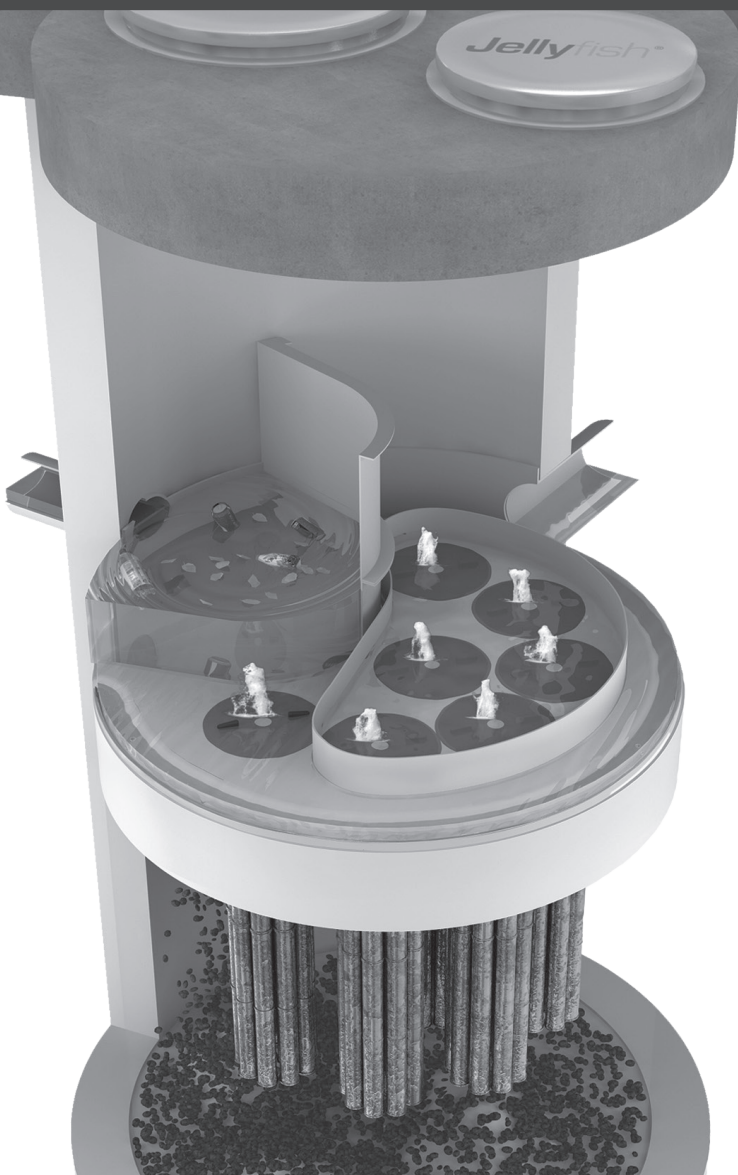
Silt fence has been specified downstream of the areas of proposed soil disturbance to provide pollution abatement of onsite flows. Bagged gravel filters will be utilized to minimize contamination entering storm drainage facilities. Rock berms will be implemented to abate sediment contamination for drainage facilities exiting the site. Temporary BMPs will be maintained and kept onsite until re-growth of the natural vegetation occurs to provide the required soil stabilization in the event any areas are more than minimally disturbed. If required, appropriate seeding measures will be employed.



ATTACHMENT I – INSPECTION AND MAINTENANCE FOR BMP

Attached after this sheet is the inspection and maintenance procedures for the Contech Jellyfish Stormwater treatment system.

JellyFish[®] Filter Maintenance Guide





JELLYFISH® FILTER MANHOLE CONFIGURATIONS INSPECTION & MAINTENANCE GUIDE

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1.0 Inspection and Maintenance Overview

The primary purpose of the Jellyfish® Filter is to capture and remove pollutants from stormwater runoff. As with any filtration system, these pollutants must be removed to maintain the filter's maximum treatment performance. Regular inspection and maintenance are required to insure proper functioning of the system.

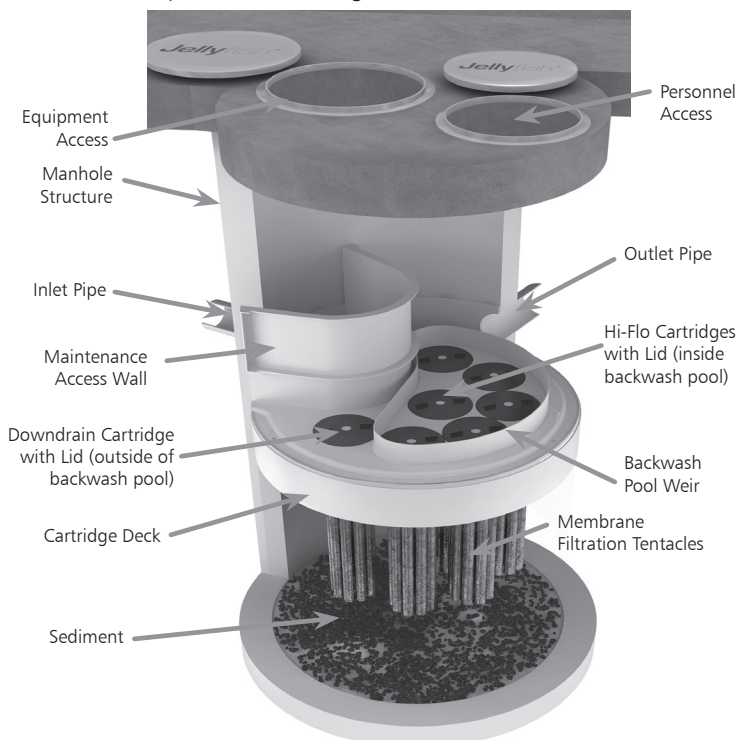
Maintenance frequencies and requirements are site specific and vary depending on pollutant loading. Additional maintenance activities may be required in the event of non-storm event runoff, such as base-flow or seasonal flow, an upstream chemical spill or due to excessive sediment loading from site erosion or extreme runoff events. It is a good practice to inspect the system after major storm events.

Inspection activities are typically conducted from surface observations and include:

- Observe if standing water is present
- Observe if there is any physical damage to the deck or cartridge lids
- Observe the amount of debris in the Maintenance Access Wall (MAW)

Maintenance activities typically include:

- Removal of oil, floatable trash and debris
- Removal of collected sediments
- Rinsing and re-installing the filter cartridges
- Replace filter cartridge tentacles, as needed



Note: Separator Skirt not shown

2.0 Inspection Timing

Inspection of the Jellyfish Filter is key in determining the maintenance requirements for, and to develop a history of the site's pollutant loading characteristics. In general, inspections should be performed at the times indicated below; *or per the approved project stormwater quality documents (if applicable), whichever is more frequent.*

1. Post-construction inspection is required prior to putting the Jellyfish Filter into service. All construction debris or construction-related sediment within the device must be removed, and any damage to system components repaired, before installing the filter cartridges.
2. A minimum of two inspections during the first year of operation to assess the sediment and floatable pollutant accumulation, and to ensure proper functioning of the system.
3. Inspection frequency in subsequent years is based on the inspection and maintenance plan developed in the first year of operation. Minimum frequency should be once per year.
4. Inspection is recommended after each major storm event.
5. Inspection is required immediately after an upstream oil, fuel or other chemical spill.

3.0 Inspection Procedure

The following procedure is recommended when performing inspections:

1. Provide traffic control measures as necessary.
2. Inspect the MAW for floatable pollutants such as trash, debris, and oil sheen.
3. Measure oil and sediment depth in several locations, by lowering a sediment probe through the MAW opening until contact is made with the floor of the structure. Record sediment depth, and presences of any oil layers.
4. Inspect cartridge lids. Missing or damaged cartridge lids to be replaced.
5. Inspect the MAW, cartridge deck, and backwash pool weir, for cracks or broken components. If damaged, repair is required.

3.1 Dry weather inspections

- Inspect the cartridge deck for standing water, and/or sediment on the deck.
- No standing water under normal operating conditions.
- Standing water inside the backwash pool, but not outside the backwash pool indicates that the filter cartridges need to be rinsed.



Inspection Utilizing Sediment Probe

- Standing water outside the backwash pool may indicate a backwater condition caused by high water elevation in the receiving water body, or possibly a blockage in downstream infrastructure.
- Any appreciable sediment ($\geq 1/16"$) accumulated on the deck surface should be removed.

3.2 Wet weather inspections

- Observe the rate and movement of water in the unit. Note the depth of water above deck elevation within the MAW.
- Less than 6 inches, flow should be exiting the cartridge lids of each of the draindown cartridges (i.e. cartridges located outside the backwash pool).
- Greater than 6 inches, flow should be exiting the cartridge lids of each of the draindown cartridges and each of the hi-flo cartridges (i.e. cartridges located inside the backwash pool), and water should be overflowing the backwash pool weir.
- 18 inches or greater and relatively little flow is exiting the cartridge lids and outlet pipe, this condition indicates that the filter cartridges are occluded with sediment and need to be rinsed

4.0 Maintenance Requirements

Required maintenance for the Jellyfish Filter is based upon results of the most recent inspection, historical maintenance records, or the site specific water quality management plan; whichever is more frequent. In general, maintenance requires some combination of the following:

1. Sediment removal for depths reaching 12 inches or greater, or within 3 years of the most recent sediment cleaning, whichever occurs sooner.
2. Floatable trash, debris, and oil removal.
3. Deck cleaned and free from sediment.
4. Filter cartridges rinsed and re-installed as required by the most recent inspection results, or within 12 months of the most recent filter rinsing, whichever occurs sooner.
5. Replace tentacles if rinsing does not restore adequate hydraulic capacity, remove accumulated sediment, or if damaged or missing. It is recommended that tentacles should remain in service no longer than 5 years before replacement.
6. Damaged or missing cartridge deck components must be repaired or replaced as indicated by results of the most recent inspection.
7. The unit must be cleaned out and filter cartridges inspected immediately after an upstream oil, fuel, or chemical spill. Filter cartridge tentacles should be replaced if damaged or compromised by the spill.

5.0 Maintenance Procedure

The following procedures are recommended when maintaining the Jellyfish Filter:

1. Provide traffic control measures as necessary.
2. Open all covers and hatches. Use ventilation equipment as required, according to confined space entry procedures.
3. Caution: Dropping objects onto the cartridge deck may cause damage.

4. Perform Inspection Procedure prior to maintenance activity.
5. To access the cartridge deck for filter cartridge service, descend the ladder and step directly onto the deck. Caution: Do not step onto the maintenance access wall (MAW) or backwash pool weir, as damage may result. Note that the cartridge deck may be slippery.
6. Maximum weight of maintenance crew and equipment on the cartridge deck not to exceed 450 lbs.

5.1 Filter Cartridge Removal

1. Remove a cartridge lid.
2. Remove cartridges from the deck using the lifting loops in the cartridge head plate. Rope or a lifting device (available from Contech) should be used. Caution: Should a snag occur, do not force the cartridge upward as damage to the tentacles may result. Wet cartridges typically weigh between 100 and 125 lbs.
3. Replace and secure the cartridge lid on the exposed empty receptacle as a safety precaution. Contech does not recommend exposing more than one empty cartridge receptacle at a time.

5.2 Filter Cartridge Rinsing

1. Remove all 11 tentacles from the cartridge head plate. Take care not to damage or break the plastic threaded nut or connector.
2. Position tentacles in a container (or over the MAW), with the



Cartridge Removal & Lifting Device

threaded connector (open end) facing down, so rinse water is flushed through the membrane and captured in the container.

3. Using the Jellyfish rinse tool (available from Contech) or a low-pressure garden hose sprayer, direct water spray onto the tentacle membrane, sweeping from top to bottom along the length of the tentacle. Rinse until all sediment is removed from the membrane. Caution: Do not use a high pressure sprayer or focused stream of water on the membrane. Excessive water pressure may damage the membrane.

4. Collected rinse water is typically removed by vacuum hose.
5. Reattach tentacles to cartridge head plate. Reuse O-rings and nuts, ensuring proper placement on each tentacle.

5.3 Cleaning Procedure

1. Perform vacuum cleaning of the Jellyfish Filter only after filter cartridges have been removed from the system. Access the lower chamber for vacuum cleaning only through the maintenance access wall (MAW) opening, being careful not to damage the flexible plastic separator skirt that is attached to the underside of the deck. The separator skirt surrounds the filter cartridge zone, and could be torn if contacted by the wand. Do not lower the vacuum wand through a cartridge receptacle, as damage to the receptacle will result.
2. Vacuum floatable trash, debris, and oil, from the MAW opening. Alternatively, floatable solids may be removed by a net or skimmer.



Tentacle Rinse Using Jellyfish Rinse Tool

3. Pressure wash cartridge deck and receptacles to remove all sediment and debris. Sediment should be rinsed into the sump area. Take care not to flush rinse water into the outlet pipe.
4. Remove water from the sump area. Vacuum or pump equipment should only be introduced through the MAW.
5. Remove the sediment from the bottom of the unit through the MAW opening.



Vacuuming Sump Through MAW

6. For larger diameter Jellyfish Filter manholes (≥ 8 -ft) and vaults without an MAW opening, complete sediment removal may be facilitated by removing a cartridge lid from an empty receptacle and inserting a jetting wand (not a vacuum wand) through the receptacle. Use the sprayer to rinse loosened sediment toward the vacuum hose in the MAW opening, being careful not to damage the receptacle.

7. After the unit is clean, re-fill the lower chamber with water if required by the local jurisdiction, and re-install filter cartridges.
8. Dispose of sediment, floatable trash and debris, oil, spent tentacles, and water according to local regulatory requirements.

5.4 Filter Cartridge Replacement

1. Cartridges should be installed after the deck has been cleaned. It is important that the receptacle surfaces be free from grit and debris.
2. If rinsing is ineffective in removing sediment from the tentacles, or if tentacles are damaged, provisions must be made to replace the spent or damaged tentacles with new tentacles. Contact Contech to order replacement tentacles.
3. Lower filter cartridge to the cartridge deck. Remove cartridge lid from deck and carefully lower the filter cartridge into the receptacle until head plate gasket is seated squarely in receptacle. Caution: Should a snag occur when lowering the cartridge into the receptacle, do not force the cartridge downward; damage may occur.
4. Replace the cartridge lid and check fit before completing rotation to a firm hand-tight attachment.

5.5 Chemical Spills

Caution: If a chemical spill has been captured, do not attempt maintenance. Immediately contact the local hazard response agency and contact Contech.

6.0 Related Maintenance Activities

Jellyfish units are often just one of many structures in a more comprehensive stormwater drainage and treatment system.

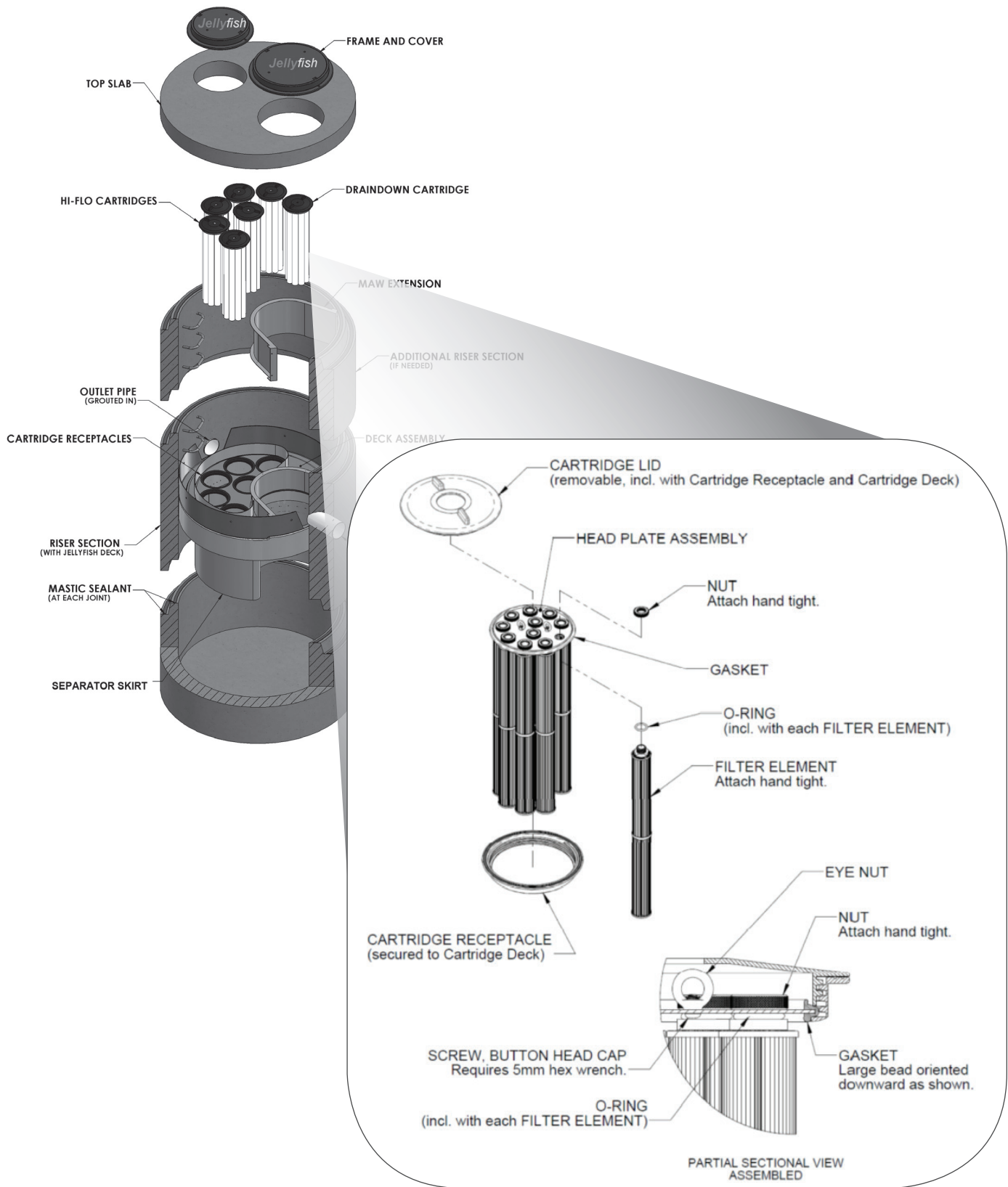
In order for maintenance of the Jellyfish filter to be successful, it is imperative that all other components be properly maintained. The maintenance and repair of upstream facilities should be carried out prior to Jellyfish maintenance activities.

In addition to considering upstream facilities, it is also important to correct any problems identified in the drainage area. Drainage area concerns may include: erosion problems, heavy oil loading, and discharges of inappropriate materials.

7.0 Material Disposal

The accumulated sediment found in stormwater treatment and conveyance systems must be handled and disposed of in accordance with regulatory protocols. It is possible for sediments to contain measurable concentrations of heavy metals and organic chemicals (such as pesticides and petroleum products). Areas with the greatest potential for high pollutant loading include industrial areas and heavily traveled roads. Sediments and water must be disposed of in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. This typically requires coordination with a local landfill for solid waste disposal. For liquid waste disposal a number of options are available including a municipal vacuum truck decant facility, local waste water treatment plant or on-site treatment and discharge.

Jellyfish Filter Components & Filter Cartridge



Jellyfish Filter Inspection and Maintenance Log

Owner:		Jellyfish Model No:	
Location:		GPS Coordinates:	
Land Use:	Commercial:	Industrial:	Service Station:
	Roadway/Highway:	Airport:	Residential:

Date/Time:						
Inspector:						
Maintenance Contractor:						
Visible Oil Present: (Y/N)						
Oil Quantity Removed:						
Floatable Debris Present: (Y/N)						
Floatable Debris Removed: (Y/N)						
Water Depth in Backwash Pool						
Draindown Cartridges externally rinsed and recommissioned: (Y/N)						
New tentacles put on Cartridges: (Y/N)						
Hi-Flo Cartridges externally rinsed and recommissioned: (Y/N)						
New tentacles put on Hi-Flo Cartridges: (Y/N)						
Sediment Depth Measured: (Y/N)						
Sediment Depth (inches or mm):						
Sediment Removed: (Y/N)						
Cartridge Lids intact: (Y/N)						
Observed Damage:						
Comments:						



Jellyfish®

CONTECH®
ENGINEERED SOLUTIONS

Support

- Drawings and specifications are available at ContechES.com/jellyfish.
- Site-specific design support is available from Contech Engineered Solutions.

800.338.1122

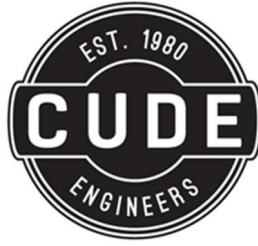
www.ContechES.com

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AGENT FORMS AND FEES SECTION

Agent Authorization Form
For Required Signature
Edwards Aquifer Protection Program
Relating to 30 TAC Chapter 213
Effective June 1, 1999

I DALE KANE,
Print Name
OWNER,
Title - Owner/President/Other
of KHERINGTON/HADLEY INVESTMENTS, LLC.,
Corporation/Partnership/Entity Name
have authorized CHRISTOPHER R. DICE/DAVID D. CUPIT II
Print Name of Agent/Engineer
of M.W. CUDE ENGINEERS, LLC.
Print Name of Firm

to represent and act on the behalf of the above named Corporation, Partnership, or Entity for the purpose of preparing and submitting this plan application to the Texas Commission on Environmental Quality (TCEQ) for the review and approval consideration of regulated activities.

I also understand that:

1. The applicant is responsible for compliance with 30 Texas Administrative Code Chapter 213 and any condition of the TCEQ's approval letter. The TCEQ is authorized to assess administrative penalties of up to \$10,000 per day per violation.
2. For those submitting an application who are not the property owner, but who have the right to control and possess the property, additional authorization is required from the owner.
3. Application fees are due and payable at the time the application is submitted. The application fee must be sent to the TCEQ cashier or to the appropriate regional office. The application will not be considered until the correct fee is received by the commission.
4. A notarized copy of the Agent Authorization Form must be provided for the person preparing the application, and this form must accompany the completed application.
5. No person shall commence any regulated activity on the Edwards Aquifer Recharge Zone, Contributing Zone or Transition Zone until the appropriate application for the activity has been filed with and approved by the Executive Director.

SIGNATURE PAGE:

[Signature]
Applicant's Signature

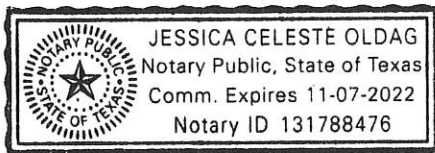
7/4/2019
Date

THE STATE OF Texas §

County of Brewer §

BEFORE ME, the undersigned authority, on this day personally appeared H. Dawkane known to me to be the person whose name is subscribed to the foregoing instrument, and acknowledged to me that (s)he executed same for the purpose and consideration therein expressed.

GIVEN under my hand and seal of office on this 12th day of JULY, 2019.



[Signature]
NOTARY PUBLIC

Jessica Celeste Oldag
Typed or Printed Name of Notary

MY COMMISSION EXPIRES: 11-07-2022

Application Fee Form

Texas Commission on Environmental Quality

Name of Proposed Regulated Entity: Iron Horse Townhomes

Regulated Entity Location: Helotes, TX

Name of Customer: Kherington Hadley

Contact Person: Dale Kane

Phone: 210-496-3256

Customer Reference Number (if issued):CN _____

Regulated Entity Reference Number (if issued):RN _____

Austin Regional Office (3373)

☐ Hays

☐ Travis

☐ Williamson

San Antonio Regional Office (3362)

☒ Bexar

☐ Medina

☐ Uvalde

☐ Comal

☐ Kinney

Application fees must be paid by check, certified check, or money order, payable to the **Texas Commission on Environmental Quality**. Your canceled check will serve as your receipt. **This form must be submitted with your fee payment.** This payment is being submitted to:

☐ Austin Regional Office

☒ San Antonio Regional Office

☐ Mailed to: TCEQ - Cashier

☐ Overnight Delivery to: TCEQ - Cashier

Revenues Section

Mail Code 214

P.O. Box 13088

Austin, TX 78711-3088

12100 Park 35 Circle

Building A, 3rd Floor

Austin, TX 78753

(512)239-0357

Site Location (Check All That Apply):

☒ Recharge Zone

☐ Contributing Zone

☐ Transition Zone

Type of Plan	Size	Fee Due
Water Pollution Abatement Plan, Contributing Zone Plan: One Single Family Residential Dwelling	Acres	\$
Water Pollution Abatement Plan, Contributing Zone Plan: Multiple Single Family Residential and Parks	5.09 Acres	\$ 3,000
Water Pollution Abatement Plan, Contributing Zone Plan: Non-residential	Acres	\$
Sewage Collection System	L.F.	\$
Lift Stations without sewer lines	Acres	\$
Underground or Aboveground Storage Tank Facility	Tanks	\$
Piping System(s)(only)	Each	\$
Exception	Each	\$
Extension of Time	Each	\$

Signature: 

Date: 08-01-2019

Application Fee Schedule

Texas Commission on Environmental Quality

Edwards Aquifer Protection Program 30 TAC Chapter 213 (effective 05/01/2008)

Water Pollution Abatement Plans and Modifications

Contributing Zone Plans and Modifications

<i>Project</i>	<i>Project Area in Acres</i>	<i>Fee</i>
One Single Family Residential Dwelling	< 5	\$650
Multiple Single Family Residential and Parks	< 5	\$1,500
	5 < 10	\$3,000
	10 < 40	\$4,000
	40 < 100	\$6,500
	100 < 500	\$8,000
	≥ 500	\$10,000
Non-residential (Commercial, industrial, institutional, multi-family residential, schools, and other sites where regulated activities will occur)	< 1	\$3,000
	1 < 5	\$4,000
	5 < 10	\$5,000
	10 < 40	\$6,500
	40 < 100	\$8,000
	≥ 100	\$10,000

Organized Sewage Collection Systems and Modifications

<i>Project</i>	<i>Cost per Linear Foot</i>	<i>Minimum Fee- Maximum Fee</i>
Sewage Collection Systems	\$0.50	\$650 - \$6,500

Underground and Aboveground Storage Tank System Facility Plans and Modifications

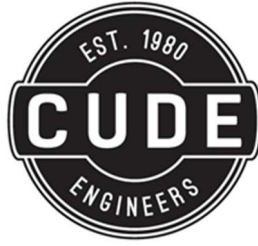
<i>Project</i>	<i>Cost per Tank or Piping System</i>	<i>Minimum Fee- Maximum Fee</i>
Underground and Aboveground Storage Tank Facility	\$650	\$650 - \$6,500

Exception Requests

<i>Project</i>	<i>Fee</i>
Exception Request	\$500

Extension of Time Requests

<i>Project</i>	<i>Fee</i>
Extension of Time Request	\$150



CORE DATA SECTION



TCEQ Use Only

TCEQ Core Data Form

For detailed instructions regarding completion of this form, please read the Core Data Form Instructions or call 512-239-5175.

SECTION I: General Information

1. Reason for Submission (If other is checked please describe in space provided.)		
<input checked="" type="checkbox"/> New Permit, Registration or Authorization (Core Data Form should be submitted with the program application.)		
<input type="checkbox"/> Renewal (Core Data Form should be submitted with the renewal form)		<input type="checkbox"/> Other
2. Customer Reference Number (if issued)	Follow this link to search for CN or RN numbers in Central Registry**	3. Regulated Entity Reference Number (if issued)
CN		RN

SECTION II: Customer Information

4. General Customer Information		5. Effective Date for Customer Information Updates (mm/dd/yyyy)		08-05-2019	
<input checked="" type="checkbox"/> New Customer		<input type="checkbox"/> Update to Customer Information		<input type="checkbox"/> Change in Regulated Entity Ownership	
<input type="checkbox"/> Change in Legal Name (Verifiable with the Texas Secretary of State or Texas Comptroller of Public Accounts)					
The Customer Name submitted here may be updated automatically based on what is current and active with the Texas Secretary of State (SOS) or Texas Comptroller of Public Accounts (CPA).					
6. Customer Legal Name (If an individual, print last name first: eg: Doe, John) <i>If new Customer, enter previous Customer below:</i>					
KHERINGTON HADLEY					
7. TX SOS/CPA Filing Number		8. TX State Tax ID (11 digits)		9. Federal Tax ID (9 digits)	
0801895608		32052642686		464294856	
10. DUNS Number (if applicable)					
11. Type of Customer: <input checked="" type="checkbox"/> Corporation <input type="checkbox"/> Individual Partnership: <input type="checkbox"/> General <input type="checkbox"/> Limited					
Government: <input type="checkbox"/> City <input type="checkbox"/> County <input type="checkbox"/> Federal <input type="checkbox"/> State <input type="checkbox"/> Other <input type="checkbox"/> Sole Proprietorship <input type="checkbox"/> Other:					
12. Number of Employees <input checked="" type="checkbox"/> 0-20 <input type="checkbox"/> 21-100 <input type="checkbox"/> 101-250 <input type="checkbox"/> 251-500 <input type="checkbox"/> 501 and higher				13. Independently Owned and Operated? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
14. Customer Role (Proposed or Actual) – as it relates to the Regulated Entity listed on this form. Please check one of the following:					
<input type="checkbox"/> Owner <input type="checkbox"/> Operator <input checked="" type="checkbox"/> Owner & Operator					
<input type="checkbox"/> Occupational Licensee <input type="checkbox"/> Responsible Party <input type="checkbox"/> Voluntary Cleanup Applicant <input type="checkbox"/> Other:					
15. Mailing Address:					
18618 TUSCANY STONE					
SUITE 210					
City		SAN ANTONIO		State	TX
ZIP		78258		ZIP + 4	
16. Country Mailing Information (if outside USA)				17. E-Mail Address (if applicable)	
				DKANE@DIRTDEALERS.COM	
18. Telephone Number		19. Extension or Code		20. Fax Number (if applicable)	
(210) 496-7775				() -	

SECTION III: Regulated Entity Information

21. General Regulated Entity Information (If 'New Regulated Entity' is selected below this form should be accompanied by a permit application)		
<input checked="" type="checkbox"/> New Regulated Entity <input type="checkbox"/> Update to Regulated Entity Name <input type="checkbox"/> Update to Regulated Entity Information		
The Regulated Entity Name submitted may be updated in order to meet TCEQ Agency Data Standards (removal of organizational endings such as Inc, LP, or LLC.)		
22. Regulated Entity Name (Enter name of the site where the regulated action is taking place.)		
IRON HORSE TOWNHOMES		

23. Street Address of the Regulated Entity: (No PO Boxes)							
	City	HELOTES	State	TX	ZIP	78023	ZIP + 4
24. County	BEXAR						

Enter Physical Location Description if no street address is provided.

25. Description to Physical Location:	Unplatted lot between the intersections of Iron Horse Way and Lost Horse, and Iron Horse Way and Antonio Drive.						
26. Nearest City	HELOTES				State	TX	Nearest ZIP Code
						78023	
27. Latitude (N) In Decimal:	29.56750000			28. Longitude (W) In Decimal:	98.69611111		
Degrees	Minutes	Seconds		Degrees	Minutes	Seconds	
29	34	2.71		98	41	46.25	
29. Primary SIC Code (4 digits)	30. Secondary SIC Code (4 digits)		31. Primary NAICS Code (5 or 6 digits)		32. Secondary NAICS Code (5 or 6 digits)		
1521			236115				
33. What is the Primary Business of this entity? (Do not repeat the SIC or NAICS description.)							
NEW RESIDENTIAL HOME CONSTRUCTION							
34. Mailing Address:	18618 TUSCANY STONE						
	SUITE 210						
	City	SAN ANTONIO	State	TX	ZIP	78258	ZIP + 4
35. E-Mail Address:							
36. Telephone Number		37. Extension or Code		38. Fax Number (if applicable)			
(210) 496-7775				(210) 496-3256			

39. TCEQ Programs and ID Numbers Check all Programs and write in the permits/registration numbers that will be affected by the updates submitted on this form. See the Core Data Form instructions for additional guidance.

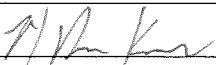
<input type="checkbox"/> Dam Safety	<input type="checkbox"/> Districts	<input checked="" type="checkbox"/> Edwards Aquifer	<input type="checkbox"/> Emissions Inventory Air	<input type="checkbox"/> Industrial Hazardous Waste
<input type="checkbox"/> Municipal Solid Waste	<input type="checkbox"/> New Source Review Air	<input type="checkbox"/> OSSF	<input type="checkbox"/> Petroleum Storage Tank	<input type="checkbox"/> PWS
<input type="checkbox"/> Sludge	<input type="checkbox"/> Storm Water	<input type="checkbox"/> Title V Air	<input type="checkbox"/> Tires	<input type="checkbox"/> Used Oil
<input type="checkbox"/> Voluntary Cleanup	<input type="checkbox"/> Waste Water	<input type="checkbox"/> Wastewater Agriculture	<input type="checkbox"/> Water Rights	<input type="checkbox"/> Other:

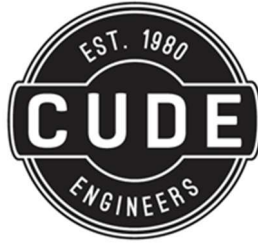
SECTION IV: Preparer Information

40. Name:	CHRISTOPHER R. DICE	41. Title:	EXECUTIVE VICE PRESIDENT
42. Telephone Number	43. Ext./Code	44. Fax Number	45. E-Mail Address
(210) 681-2951		() -	CDICE@CUDEENGINEERS.COM

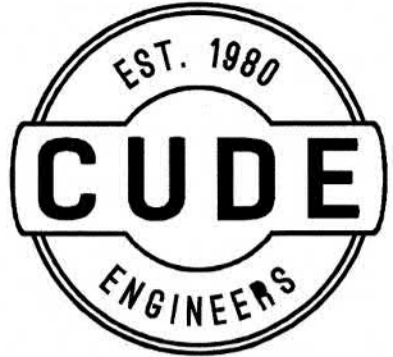
SECTION V: Authorized Signature

46. By my signature below, I certify, to the best of my knowledge, that the information provided in this form is true and complete, and that I have signature authority to submit this form on behalf of the entity specified in Section II, Field 6 and/or as required for the updates to the ID numbers identified in field 39.

Company:	KHERINGTON HADLEY	Job Title:	OWNER
Name(In Print) :	DALE KANE	Phone:	(210) 681-2951
Signature:			Date:



DEED INFORMATION



4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
P:(210) 681.2951 F: (210) 523.7112

CATEGORY 1B SURVEY
5.081 ACRES

CHARLES STOLZ SURVEY NO. 431 1/2, ABSTRACT NO. 734
C.B. 4483, CITY OF HELOTES, BEXAR COUNTY, TEXAS

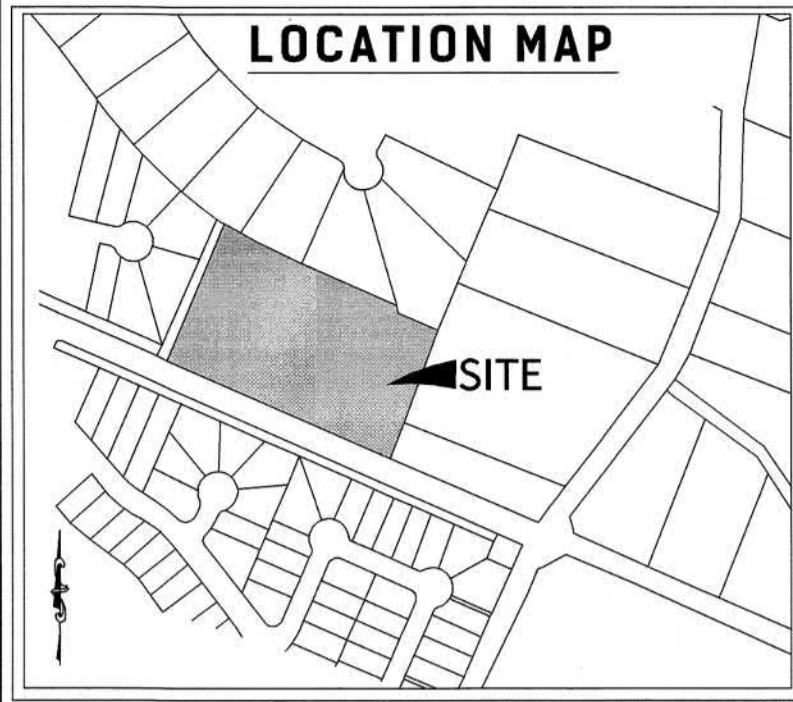
DATE
JULY 19, 2019

PROJECT NO.
03404.000

DRAWN BY
B.D.B.

CHECKED BY
J.W.R. & B.B.

CUDE ENGINEERS
TBPE No. 455
TBPLS No. 10048500



LEGEND

D.P.R.B.C.T. = DEED AND PLAT RECORDS, BEXAR COUNTY, TEXAS
D..R.B.C.T. = DEED RECORDS, BEXAR COUNTY, TEXAS
O.P.R.B.C.T. = OFFICIAL PUBLIC RECORDS, BEXAR COUNTY, TEXAS
R.O.W. = RIGHT OF WAY
P.O.C. = POINT OF COMMENCEMENT
P.O.B. = POINT OF BEGINNING

- = MAILBOX
- = GW = GUY WIRE
- = PP = POWER POLE
- = BP = BOLLARD POST
- = ELTR = ELECTRIC TRANSFORMER
- = W = WATER METER
- = E = ELECTRIC PEDESTAL
- = T = TELEPHONE PEDESTAL
- = VV = WATER VALVE
- = FH = FIRE HYDRANT
- = CO = CLEAN OUT
- = GV = GAS VALVE
- = AC = AC PAD
- = S = SIGN
- = W = WATER WELL
- = f = WATER SPIGOT

- = OHE = OVERHEAD ELECTRIC
- = // = WOOD FENCE
- = * = WIRE FENCE

- = SET 1/2" IRON ROD WITH CAP STAMPED "CUDE"
- = FOUND COTTON SPINDLE
- = FOUND 1/2" IRON ROD
- = FOUND 1/2" IRON ROD WITH "OPEN RANGE" CAP
- = FOUND 1/2" IRON ROD WITH YELLOW PLASTIC CAP
- = FOUND PK NAIL WITH "OPEN RANGE" WASHER

NOTES:

1. BASIS OF BEARING IS THE TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE (4204), NAD 83 (93).
2. THIS SURVEY WAS PERFORMED WITHOUT THE BENEFIT OF A CURRENT TITLE REPORT/COMMITMENT.
3. SETBACKS, EASEMENTS, RESTRICTIONS OR ZONING REQUIREMENTS MAY EXIST.

STATE OF TEXAS
COUNTY OF BEXAR

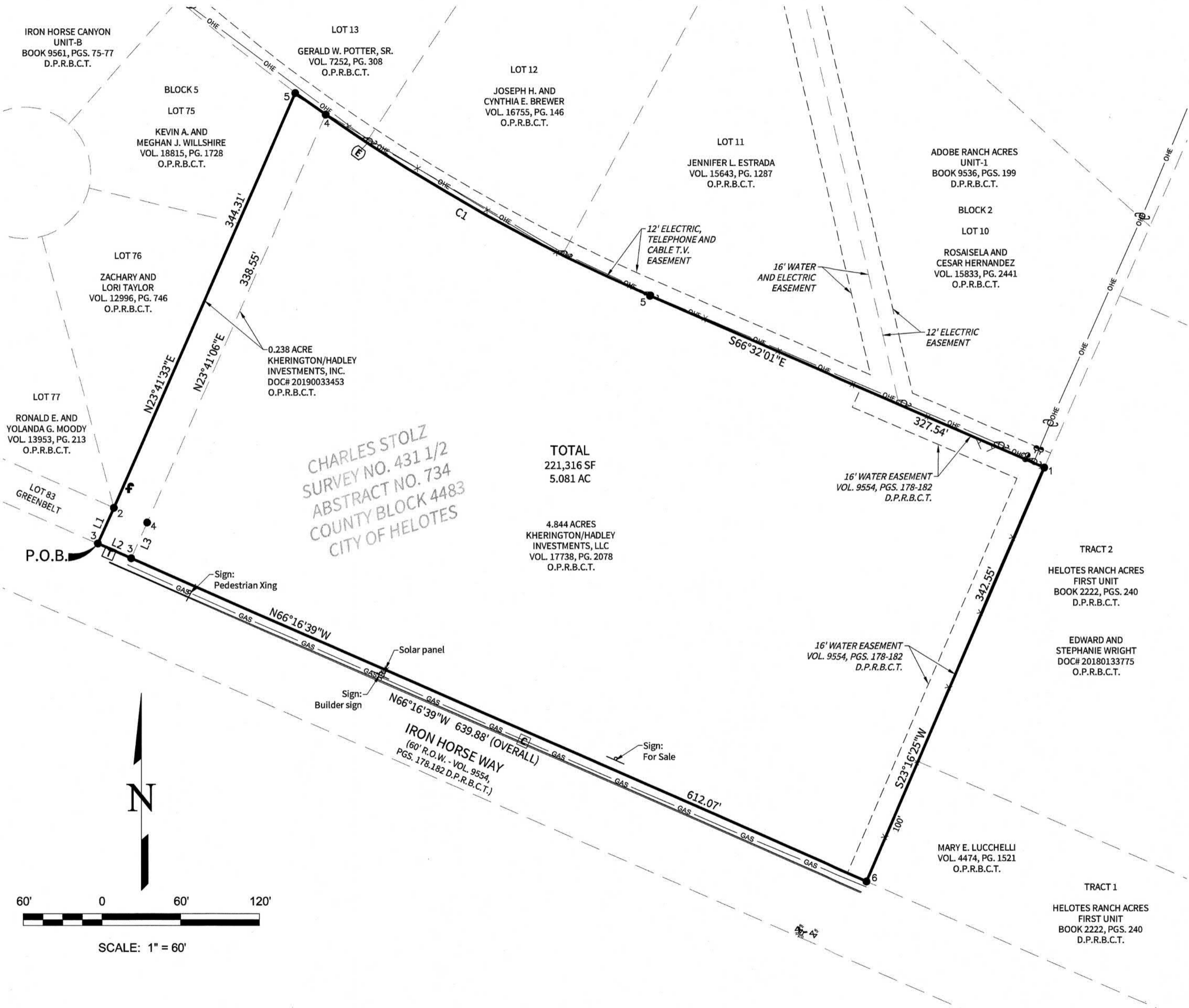
I HEREBY CERTIFY THAT THIS SURVEY REPRESENTS FACTS DISCLOSED BY AN ON THE GROUND SURVEY MADE UNDER MY SUPERVISION AND CONFORMS TO A TSPS CATEGORY 1B, CONDITION II LAND TITLE SURVEY AND THAT EXCEPT AS SHOWN ABOVE THERE ARE NO VISIBLE EASEMENTS OR INTRUSIONS OR PROTRUSIONS OF IMPROVEMENTS ON ADJOINING PROPERTY.

James W. Russell 7/25/19
JAMES W. RUSSELL, R.P.L.S.
TEXAS NO. 4230



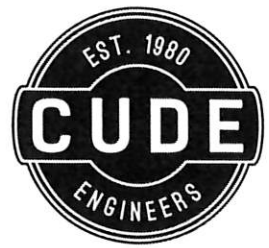
LINE TABLE		
LINE NO.	BEARING	DISTANCE
L1	N23°57'23"E	29.73'
L2	N66°16'39"W	27.81'
L3	N23°57'23"E	29.65'

CURVE TABLE				
CURVE NO.	DELTA	ARC LENGTH	RADIUS	CHORD BEARING
C1	12°46'23"	312.10'	1400.00'	S60°12'06"E



BOUNDARY AND IMPROVEMENT SURVEY OF

5.081 ACRES OF LAND LOCATED IN THE CHARLES STOLZ SURVEY, NUMBER 431 1/2, ABSTRACT NUMBER 734, COUNTY BLOCK 4483, CITY OF HELOTES, BEXAR COUNTY, TEXAS AND BEING ALL OF THAT CERTAIN 4.844 ACRES OF LAND CONVEYED TO KHERINGTON/HADLEY INVESTMENTS, LLC, AS DESCRIBED IN VOLUME 17738, PAGE 2078, OFFICIAL PUBLIC RECORDS OF BEXAR COUNTY, TEXAS AND ALL OF THAT CERTAIN 0.238 ACRES OF LAND CONVEYED TO KHERINGTON/HADLEY INVESTMENTS, LLC, AS DESCRIBED IN DOCUMENT NUMBER 20190033453, OFFICIAL PUBLIC RECORDS OF BEXAR COUNTY, TEXAS.



LEGAL DESCRIPTION
5.081 ACRES OF LAND

5.081 acres of land located in the Charles Stolz Survey, Number 431 ½, Abstract Number 734, County Block 4483, City of Helotes, Bexar County, Texas and being all of that certain 4.844 acres of land conveyed to Kherington/Hadley Investments, LLC, as described in Volume 17738, Page 2078, Official Public Records of Bexar County, Texas and all of that certain 0.238 acres of land conveyed to Kherington/Hadley Investments, LLC, as described in Document Number 20190033453, Official Public Records of Bexar County, Texas; said 5.081 acres being more particularly described as follows:

BEGINNING, at a found ½ inch iron rod located in the northeasterly right of way line of Iron Horse Way (60.00' wide), according to the map or plat thereof recorded in Volume 9554, Pages 178-182, Deed and Plat Records of Bexar County and marking the most southerly corner of Iron Horse Canyon, Unit B, according to the map or plat thereof recorded in Volume 9561, Pages 75-77, Deed and Plat Records of Bexar County, Texas;

THENCE, leaving the northeasterly right of way line of Iron Horse Way and along the southeasterly line of Iron Horse Canyon, Unit B, the following courses:

North 23deg 57' 23" East, a distance of 29.73 feet, to a found cotton spindle;

North 23deg 41' 33" East, a distance of 344.31 feet, to a found ½ inch iron rod with "YPC" cap located in the southwesterly line of Adobe Ranch Acres, Unit 1, according to the map or plat thereof recorded in Volume 9536, Page 199, Deed and Plat Record of Bexar County, Texas;

THENCE, along the southwesterly line of Adobe Ranch Acres, Unit 1, the following courses:

Southeasterly, along the arc of a curve to the left having a radius of 1400.00 feet, a central angle of 12deg 46' 23", an arc length of 312.10 feet and a chord bearing: S 60deg 12' 06" E, 311.46 feet, to a found ½ inch iron rod with "Yellow" cap;

South 66deg 32' 01" East, a distance of 327.54 feet, to a set ½ inch iron rod with "CUDE" cap located in the northwesterly line of Helotes Ranch Acres, according to the map or plat thereof recorded in Volume 2222, Page 240, Deed and Plat Records of Bexar County, Texas;

THENCE, South 23deg 16' 25" West, along the northwesterly line of Helotes Ranch Acres, a distance of 342.55 feet, to a found P.K. Nail with "OPEN RANGE" washer located in the northeasterly right of way line of Iron Horse Way;

THENCE, North 66deg 16' 39" West, along the northeasterly right of way line Iron Horse Way, at a distance of 612.07 feet, passing a found ½ inch iron rod, in all a total distance of 639.88 feet, to the **POINT OF BEGINNING** and containing 5.081 acres of land, more or less.

Basis of bearings is the Texas State Plane Coordinate System, South Central Zone (4204), NAD 83 (93).

 7/26/19

James W. Russell
Registered Professional Land Surveyor No. 4230
Cude Engineers
4122 Pond Hill Road, Suite 101
San Antonio, Texas 78231
TBPLS Firm No. 10048500
TBPE Firm No. 455
Job No. 03404.000



CHICAGO TITLE GF# 4311024579-RJ

NOTICE OF CONFIDENTIALITY RIGHTS: IF YOU ARE A NATURAL PERSON, YOU MAY REMOVE OR STRIKE ANY OR ALL OF THE FOLLOWING INFORMATION FROM ANY INSTRUMENT THAT TRANSFERS AN INTEREST IN REAL PROPERTY BEFORE IT IS FILED FOR RECORD IN THE PUBLIC RECORDS: YOUR SOCIAL SECURITY NUMBER OR YOUR DRIVER'S LICENSE NUMBER.

SPECIAL WARRANTY DEED WITH VENDOR'S LIEN

Date: March 11, 2016

Grantor: TODD BUREK and SHARON BRIMHALL aka SHARON A. BRIMHALL

Grantor's Mailing Address:

TODD BUREK

_____ County

SHARON BRIMHALL aka SHARON A. BRIMHALL
9619 French Stone
Helotes, Texas 78023
Bexar County

Grantee: KHERINGTON/HADLEY INVESTMENTS, LLC, a Texas limited liability company

Grantee's Mailing Address:

18618 Tuscany Stone
San Antonio, Texas 78258
Bexar County

Consideration: Cash and a note of even date executed by Grantee and payable to the order of SHARON A. BRIMHALL in the principal amount of THREE HUNDRED TWENTY THOUSAND AND 00/100THS DOLLARS (\$320,000.00) which represents part payment of the purchase price of the property. The note is secured by a first and superior vendor's lien and superior title retained in this deed in favor of SHARON A. BRIMHALL and by a first-lien deed of trust of even date from Grantee to RUDY CANTU, Trustee.

Property (including any improvements):

BEING 4.844 acres of land out of the CHARLES STOLZ SURVEY No. 431 1/2, ABSTRACT No. 734, Bexar County, Texas, said 4.844 acres being out of a 1,229.15 acre tract recorded in Volume 8061, Page 1257 of the Deed & Plat Records of Bexar County, Texas (DPRBCT)(R1), said 4.844 acre tract being more particularly described by metes and bounds in Exhibit "A" attached hereto and made a part hereof.

Reservations from and Exceptions to Conveyance and Warranty:

Validly existing easements, rights-of-way, and prescriptive rights, whether of record or not; all presently recorded and validly existing instruments, other than conveyances of the surface fee estate, that

SPECIAL WARRANTY DEED WITH VENDOR'S LIEN
PAGE 2 OF 3

